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skin diver

FOREMOST AUTHORITY IN ITS FIELD

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IN CANADA
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DECEMBER 1982

Pennekamp Park The Endless Adventure

Rare Pupfish
Faces Extinction

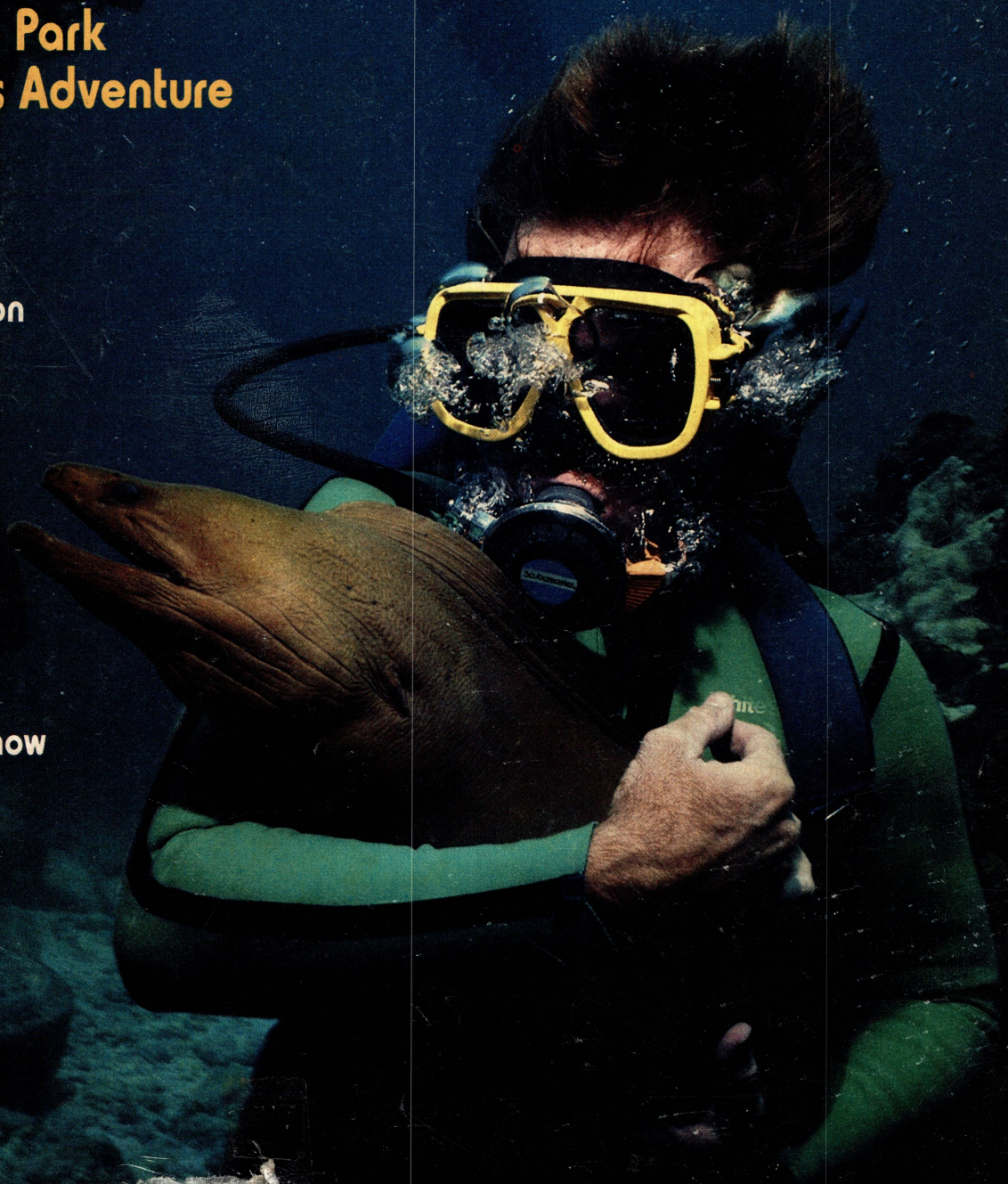
Anti-Shark Potion
From Fireflies

Sub Sunk
Crew Saved

Delicate
Sea Jellies

Dive Haiti
Isle Of Magic

Shoot A Slide Show



EQUIPMENT REPORTS: Heuer Watch • Oceanmaster Regulator
• Angler V-22F • Scubapro Lights • Radhial 955
• Automa Line Marker Buoy • Efrom SC-100M

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limited warranty



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Mini Quartz 30
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\$435.00



Champagne Mini Atlantis
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Nikon
We take the world's
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**DON'T JUST TALK ABOUT IT-
SHOW IT.**



circle # 101 on Reader Service Card

skin diver

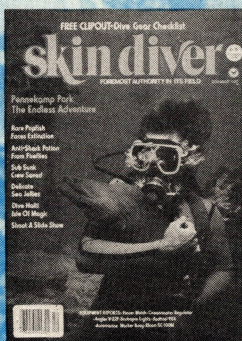
Volume Thirty-One Number Twelve

FEATURES

- | | | | |
|-----------------|-----|--------------------------------|--|
| ADVENTURE | 12 | DEEP RESCUE | E.R. CROSS |
| | | | The U.S.S. Squalus disaster |
| | 32 | DEVIL'S HOLE | HILLARY HAUSER |
| | | | Desert pupfish in jeopardy |
| READER PREMIUM | 19 | SDM'S EQUIPMENT CHECKLIST | BONNIE J. CARDONE |
| | | | Unforgettable |
| DIVE EQUIPMENT | 41 | HEUER PHOSPHORESCENT WATCH | BONNIE J. CARDONE |
| | 44 | OCEANMASTER REGULATOR | GEORGE COZENS |
| | 46 | RADHIAL 955 R INFLATABLE | ERIC HANAUER |
| | 48 | EFCOM SC-100M U/W COMMUNICATOR | HOWARD HALL |
| | 51 | SCUBAPRO DIVE LIGHTS | JIM WALKER |
| | 52 | ANGLER V-22 DIVE BOAT | STEVE LUCAS |
| | 54 | WATERLUNG'S SNAPPER BAG | MARTY SNYDERMAN |
| | 55 | AUTOMARINE MARKER BUOY | HOWARD HALL |
| | 56 | SEASPORT'S ROLLER TANK BOOT | ERIC HANAUER |
| MISCELLANEOUS | 42 | FIREFLIES VS JAWS | ELLSWORTH BOYD |
| | | | Shark repellent research |
| | 110 | CHRISTMAS AT DEPTH | BOB BURGESS |
| | | | Underwater holiday celebration |
| LOCAL DIVING | 58 | PENNEKAMP PARK | STEPHEN FRINK |
| | | | 100 square miles of diving |
| MARINE LIFE | 64 | SEA JELLIES | BILL HARRIGAN |
| | | | Jellyfish can be beautiful |
| PHOTOGRAPHY | 68 | PLANNING SLIDE SHOWS | JIM AND CATHY CHURCH |
| | | | Organize sequence for effect |
| FOREIGN TRAVEL | 73 | FIJI | CARL ROESSLER |
| | | | Live-aboard diving on Great Astrolabe Reef |
| | 88 | DIVE BONAIRE | RICK FREHSEE |
| | | | Interview with Peter and Alice Hughes |
| | 92 | HAITI | RICK FREHSEE |
| | | | Mystic contrasts |
| PHOTO EQUIPMENT | 100 | HULCHERAMA PANORAMIC CAMERA | PETER SKINNER |
| | | | 360 degree field of view |

DEPARTMENTS

- | | | | |
|----|---------------|-----|-------------------|
| 10 | SDM INDEX | 66 | FISH OF THE MONTH |
| 26 | Rx FOR DIVERS | 115 | DIVER'S CALENDAR |
| 49 | SCUBA QUIZ | 120 | DIVER'S DIRECTORY |



COVER

A six foot moray eel near the Statue in Pennekamp Park was so friendly that photographer Stephen Frink set his camera down and cradled the eel in his arms. His underwater model, Janette Weeks, a budding photographer, picked up the camera and recorded the moment on film. For more on Pennekamp see page 58.

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SDM Editorial

BY THE PUBLISHER

KEEPING SCUBA SAFE

Perhaps the most crucial aspect of this sport is *training*. Because of the harsh environment into which divers go, and because their life depends upon proper use of their equipment, training has become an issue of paramount importance. Scuba equipment sales and their crucial link with scuba training has become a matter of grave concern. On this issue scuba instructors and dive store owners are in complete agreement.

In the United States, we have a system of free enterprise and it is difficult to control the sale of almost anything. Anyone can sell anything they wish at whatever price they choose as long as it is not prohibited by specific state or federal laws. On one hand, the dive industry is fortunate to be free of such government controls and regulations; but, on the other hand, the very same industry is faced with the responsibility for the protection and safety of the consumer.

Compared to most sports, the scuba diving industry has been extraordinarily successful in its efforts to regulate the sale of equipment and link it directly to training. The industry has instituted a system of volunteer control (C-cards) in which most retail stores require enrollment in a training course or proof of scuba certification before they will sell, rent or fill scuba cylinders. This volunteer system, and the creation of the C-card concept, has probably been the single most important move in the development of a safety conscious sport. While this system may be far from perfect, it works. As a result, almost 200,000 people enroll in scuba training courses every year.

Even though the scuba diving industry has been immensely successful in the development and promotion of scuba training to the uninformed public, we still have areas of concern. More than one million people in the United States have undergone scuba training and certification, and yet there are still many people who do not realize the need for training. To those of us who have received train-

ing, it is almost unthinkable that anyone would attempt to use scuba gear without proper instruction, but it still happens.

One of the areas of greatest controversy is the mail order sale of scuba equipment. Many instructors and dive store owners protest this activity because they seriously fear this equipment will fall into the wrong hands. It is pretty frightening to think of a young teenager, eager to get into diving, buying scuba gear through the mail and then blundering into the ocean without any training or guidance. Is this theoretical situation really a problem?

The retail dive stores that offer scuba gear for sale through the mail have taken precautions to avoid this problem. For example, most of them advertise such equipment through magazines such as *SKIN DIVER*, knowing that the majority of readers are either certified divers or in the midst of obtaining training and certification. Many mail order advertisers voluntarily place warnings in their advertisements. These point out the inherent hazards of scuba diving and strongly recommend that the potential respondent seek proper training before purchasing equipment. In addition, mail order advertisers ship their scuba tanks empty to ensure that the customer must go to a dive store to have the tank filled before attempting to dive. Since most stores require proof of certification before filling a tank, the neophyte is stopped before he/she can enter the water. As a result of these precautions, there really have not been scuba fatalities directly attributable to obtaining scuba gear via mail order and using it without proper training.

During the past year one dive equipment manufacturer made a bold step forward to prevent scuba gear falling into the hands of the untrained. U.S. Divers Company inserts a warning into their warranty cards that training is necessary before any attempt is made to use the equipment. The use of this equipment by uncertified divers will result in the invalidation of the warranty. U.S. Divers goes even further, listing the names and addresses of all the national associations engaged in basic scuba certification.

An area of much greater danger than mail order is the sale of used dive equipment to the untrained and uninformed. Scuba equipment frequently appears at swap meets and garage sales throughout the United States. In many cases neither the seller of the equipment nor the potential buyer have any idea of the dangers of scuba diving. It is the blind leading the

blind. How does this occur? Very simply, used dive equipment often falls into the hands of a second or third buyer who passes it along as just another piece of merchandise such as a pop-up toaster, set of golf clubs, or used motorcycle. As a result, there is often no warning nor any recommendations offered at the time of sale. In some cases a scuba tank is actually full at the time of the transaction and the new buyer can go directly to the water without attempting to purchase a fill. This type of sale could end in tragedy.

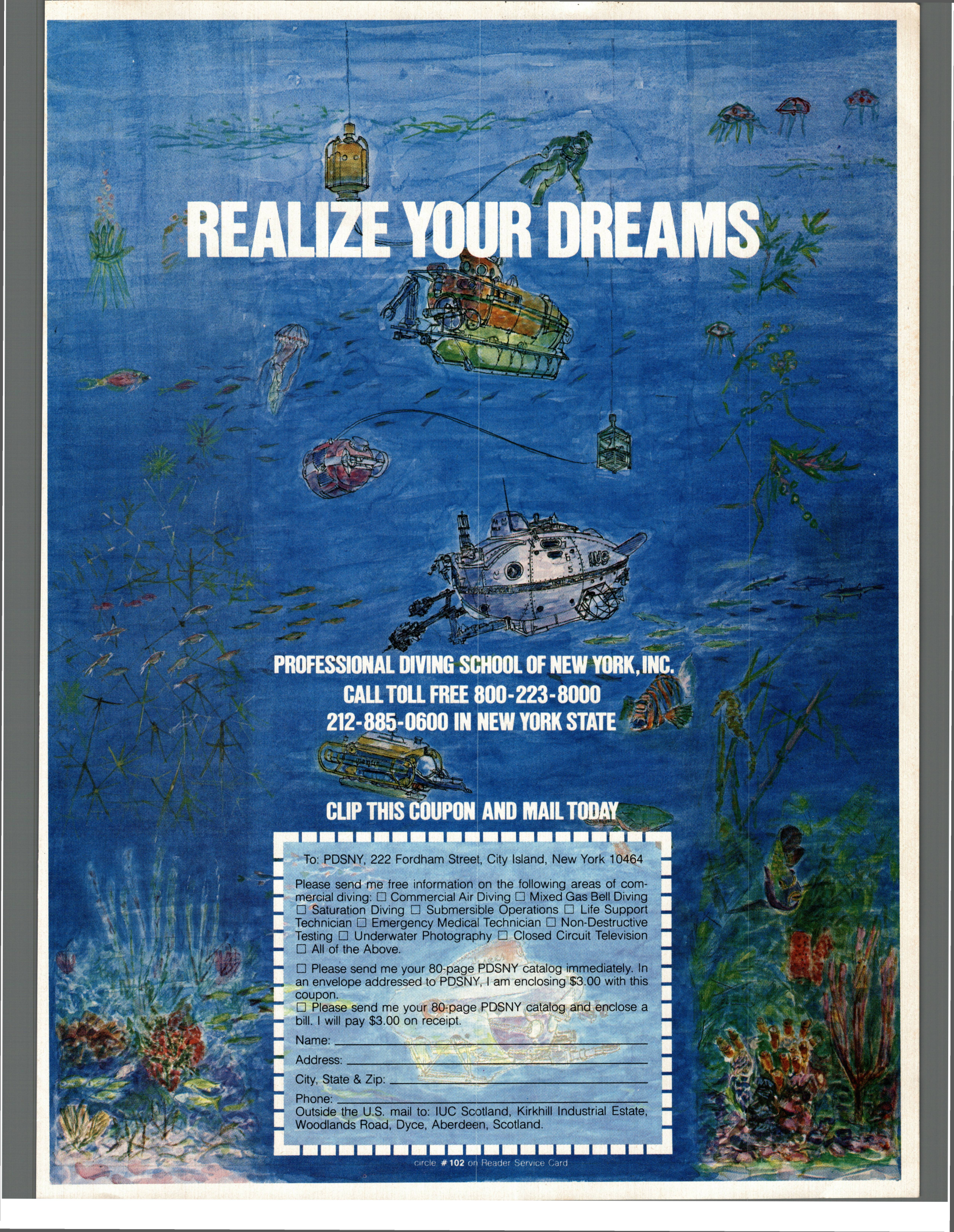
The sale of used scuba equipment is perhaps the most perplexing problem which faces the dive industry, because it is virtually impossible to control. These unauthorized sales take place under a wide variety of conditions ranging from an organized swap meet to a private sale in the backyard of a home. The dive industry finds it virtually impossible to provide a warning to the uninformed purchaser under these circumstances.

Another area of concern is the unauthorized use of scuba equipment by an uncertified friend of a diver. This occurs more frequently than most people would imagine. Visiting friends, relatives or neighbors request an opportunity to try the equipment in a backyard pool or in a quiet cove at the beach. It is hard to turn down such a request from a friend, and, with hesitancy and reluctance, the diver agrees. He knows it is not right but what could go wrong? In many cases, nothing does go wrong for the first few sessions. Pretty soon, the diver begins to feel he is a pretty good instructor. He forgets all of the rigorous training and tests he went through for basic certification and now only sees his friend having a good time and regarding him as a hero. It is only when something goes wrong that the diver realizes how ill prepared he is for the training task. A sudden wave breaks over the two divers in the surfline; his friend becomes entangled in his equipment; or his friend becomes overtired and exhausted. It is then that tragedy strikes.

How can the dive industry cope with these problems? It won't be easy, but there are things which can be done:

- 1) Mail order advertisers of scuba equipment and other related life-support systems must make every effort to prevent equipment from falling into the hands of the uninformed and untrained. Mail order purchasers should be carefully screened for certification or other proof of training. Each mail order shipment should

(Continued on Page 106)



REALIZE YOUR DREAMS

PROFESSIONAL DIVING SCHOOL OF NEW YORK, INC.
CALL TOLL FREE 800-223-8000
212-885-0600 IN NEW YORK STATE

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Please send me free information on the following areas of commercial diving: ☐ Commercial Air Diving ☐ Mixed Gas Bell Diving
☐ Saturation Diving ☐ Submersible Operations ☐ Life Support Technician
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☐ Please send me your 80-page PDSNY catalog immediately. In an envelope addressed to PDSNY, I am enclosing \$3.00 with this coupon.

☐ Please send me your 80-page PDSNY catalog and enclose a bill. I will pay \$3.00 on receipt.

Name: _____

Address: _____

City, State & Zip: _____

Phone: _____

Outside the U.S. mail to: IUC Scotland, Kirkhill Industrial Estate, Woodlands Road, Dyce, Aberdeen, Scotland.



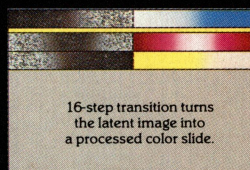
That's the Beauty of

THIS WAS SHOT IN
BLACK-AND-WHITE.

Kodak Film

HOW KODACHROME FILM ISN'T COLOR UNTIL IT GETS TO THE LAB.

Even experienced photographers are often surprised to hear that Kodachrome color slide films began as black-and-



white film. The color isn't introduced until processing is well under way.

All three emulsion layers in

Kodachrome films are processed independently, in three separate color developer solutions. To get it right, the process requires hairbreadth control; the understanding of an organic chemist; and precise sensitometric, mechanical, and chemical equipment. Which explains why only certain labs handle Kodachrome films.

They may process like thoroughbreds, but they perform like workhorses. Their detail, sharpness, brilliance, and resolution are justly famous. For optimum colors in good light, use Kodachrome 25 film. For similar results in less-than-ideal light, Kodachrome 64 film is for you.

The photograph at left was shot at 1/60 sec at f/11, using a 135 mm lens, on Kodachrome 64 film, electronic flash.

For more information on Kodachrome and other Kodak films, send for a free guide, A10-14B, to: Eastman Kodak Company, Dept. 841-SD12, Rochester, NY 14650. Send a self-addressed envelope without stamp.





Buckle up for safety.

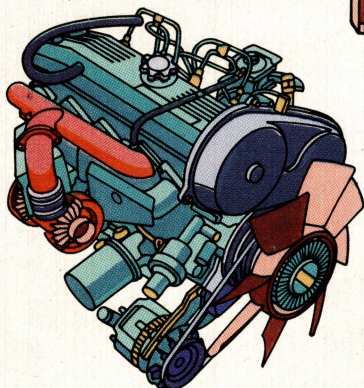
RAM TOUGH DODGE

RAM 50: NOW THE WORLD HAS TURBO DIESEL PICKUPS.

RAM MISER: AMERICA'S BEST EQUIPPED, HIGH GAS MILEAGE, STANDARD FULL-SIZE PICKUP. \$5999.*

There's a new generation of square-shouldered American-built full-size pickups: Dodge Rams. There's industry leading new technology in Dodge compact pickups. At Dodge there's greater efficiency, more durability and better performance in pickup trucks than ever before. Dodge trucks go beyond tough. They're Ram Tough.

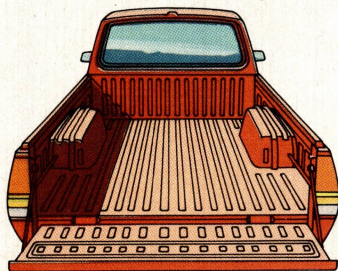
There's a new power in trucks. Turbo Diesel power. You get it from Dodge Ram 50 and it's 4x4 running mate, Power Ram 50.



TURBOCHARGED DIESEL: POWER, EFFICIENCY

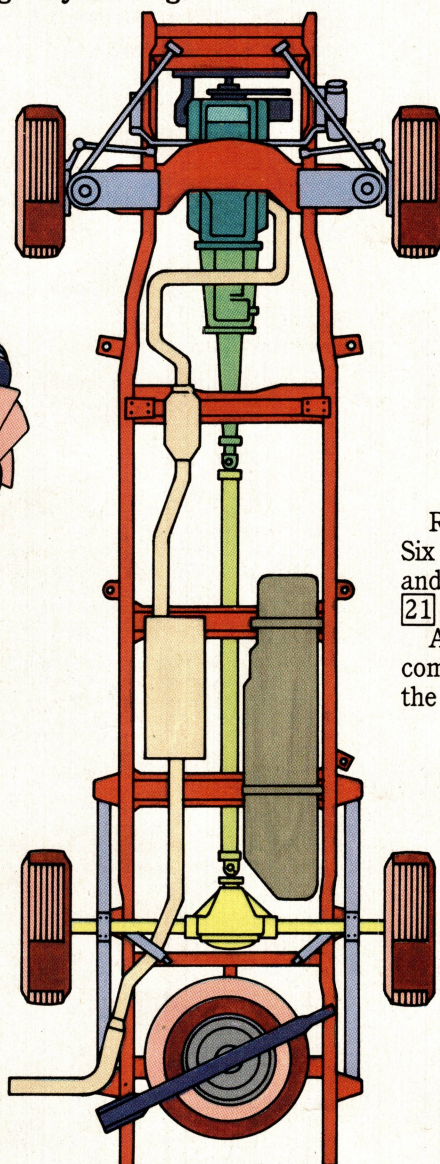
Turbocharging gives this 2.3 liter, 4-cylinder diesel engine the capability to muscle up the most horsepower and torque of any diesel in its class. It delivers responsive performance in any gear. So you'll get power for hill climbing, power for passing, power that's right there when you want it.

And turbocharging helps this fuel-injected diesel run with fuel economy that belies its power: 45 est. hwy. 34 EPA est. mpg in 4x2.**



TWO STEEL WALLS

Gas-powered Ram 50 packs a standard payload of 1630 lbs.; for the 4WD Power Ram 50 it's 1680 lbs. Royal and Sport models have all-steel double-walled cargo boxes to protect the exterior from cargo-caused dents.



7 STEEL CROSSMEMBERS IN THE FRAME

Like all full-size Dodge pickups, the long wheelbase Ram Miser has a frame of high tensile (36,000 PSI) carbon steel reinforced by 7 steel frame crossmembers for torsional rigidity and all-terrain stability.

RAM MISER: \$5999* EQUIPPED, NOT STRIPPED

Ram Miser is Dodge's lowest priced full-size pickup. And as you can see from the chart, it gives you standard features you can't get from Ford or Chevy without added cost.

DODGE RAM MISER VS. FORD AND CHEVY: MORE MPG. MORE STANDARD FEATURES.

	Dodge Ram Miser	Ford F-100	Chevy C-10
Est. Hwy./EPA est. MPG**	30 <u>21</u>	27 <u>20</u>	26 <u>19</u>
Standard Tank	20 gals.	16.5 gals.	16 gals.
Range	600 est. hwy. <u>420</u> EPA est.**	446 est. hwy. <u>330</u> EPA est.**	416 est. hwy. <u>304</u> EPA est.**
Manual overdrive transmission	Standard	Extra Cost	Extra Cost
Axle Ratio	3.21	2.47	2.56
Standard Payload	1465 lbs.	1460 lbs.	1430 lbs.
Bright wheel covers	Standard	Extra Cost	Extra Cost
Bright front bumpers	Standard	Standard	Extra Cost
Cigar lighter	Standard	Extra Cost	Extra Cost
Dual horns	Standard	Extra Cost	N/A
Day/Night mirror	Standard	N/A	N/A

*Base sticker price for 2WD excluding title, taxes and destination charges.

**Use EPA est. mpg number for comparison. Your mileage and range may vary depending on speed, distance and weather. Actual hwy. mileage and range probably less. CA est. lower. Range = EPA est. x tank capacity. *R. L. Polk & Co. registrations thru 7/1/81.

Ram Miser's proven Slant Six engine offers performance and economy: 30 est. hwy. 21 EPA est. mpg.**

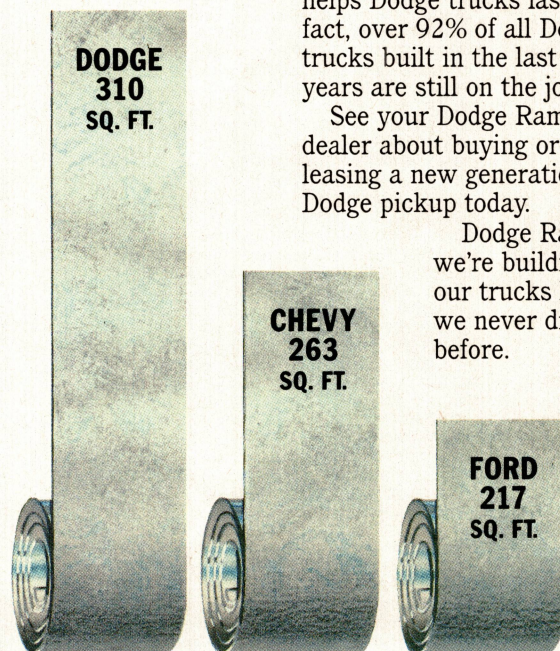
And new for '83, Ram Miser comes in a rugged 4x4, with the guts to work any turf.

GALVANIZED STEEL: 310 SQ. FT.

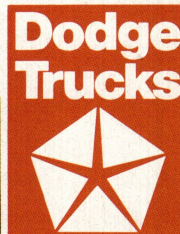
Dodge full-size Rams fight rust with the most galvanized steel in critical areas. More than Ford. More than Chevy. That's Ram Tough rust protection that helps Dodge trucks last. In fact, over 92% of all Dodge trucks built in the last 10 years are still on the job.†

See your Dodge Ram dealer about buying or leasing a new generation Dodge pickup today.

Dodge Rams: we're building our trucks like we never did before.



RAM TOUGH



THE NEW CHRYSLER CORPORATION
QUALITY ENGINEERED TO BE THE BEST

SDM INDEX

ADVENTURE

WHALE CHASE by Marty Snyderman, pg. 12, Jan.
CLAM POACHING by Ben Cropp, pg. 34, Jan.
THE GREAT OYSTER WAR by Ellsworth Boyd, pg. 30, Feb.
ANDREA DORIA TREASURE by Jack McKenney, pg. 16, Mar.
CAROLINA GOLD by Ellsworth Boyd, pg. 32, Mar.
TREASURE HUNTING by Robert Marx, pg. 18, Apr.
ANDREA DORIA PART II by Jack McKenney, pg. 70, Apr.
CALIFORNIA ABALONE DIVERS by Hillary Hauser, pg. 32, June
DIARY OF A COMMERCIAL DIVER by Steven M. Barsky, pg. 19, July
THE DEVILFISH OF EL BAJO by Jack McKenney, pg. 24, Sept.
CALIFORNIA GOLDFISH FEVER by David McCracken, pg. 24, Nov.
DOLPHINS by Howard Hall, pg. 32, Nov.
DEEP RESCUE by E.R. Cross, pg. 12, Dec.
DEVIL'S HOLE PUFFISH by Hillary Hauser, pg. 32, Dec.

COMMERCIAL DIVING

THE DIVER WHO SAVED WINCHESTER CATHEDRAL by David C. McCall, pg. 37, Jan.
SATURATION SCHOOL by Bill Gleason, pg. 56, May
FLORIDA INSTITUTE OF TECHNOLOGY by Susan Braunstein, pg. 56, Sept.

DIVE EQUIPMENT

FORCE FIN by Hillary Hauser, pg. 38, Jan.
SCUBAPRO'S A.I.R. I REGULATOR by George Cozens, pg. 42, Jan.
THE TEKNA DEPTH GAUGE by Eric Hanauer, pg. 47, Jan.
RECHARGABLE ALLAN LIGHT by Bonnie J. Cardone, pg. 48, Jan.
SEATEC'S MANTA by Howard Hall, pg. 49, Jan.
U.S. DIVERS' THIN SUIT by Jim Walker, pg. 50, Jan.
CRESSI-SUB'S OCCHIO MASK by Bonnie J. Cardone, pg. 49, Feb.
CYKLON MAXIMUM by George Cozens, pg. 50, Feb.
PRINCETON TECTONICS SPG by Jim Walker, pg. 58, Feb.
PELICAN'S SABRELITE by Bonnie J. Cardone, pg. 59, Feb.
SCUBA SEXTANT by Eric Hanauer, pg. 60, Feb.
EMERGENCY BREATHING SYSTEM by Chris McLaughlin, pg. 61, Feb.
MORROW DIVE RAY by Howard Hall, pg. 62, Feb.
BROWNIE'S THIRD LUNG by Geni Murphy, pg. 40, Mar.
PRINCETON TECTONICS DEPTH GAUGE by Bonnie J. Cardone, pg. 49, Mar.
POLARIS V'S" REGULATOR by George Cozens, pg. 54, Mar.
DIVE CAPSULE WATCH by Jim Walker, pg. 56, Mar.
SUPER QXL-LITES by Eric Hanauer, pg. 59, Mar.
TEKNA COMBO CONSOLE by Eric Hanauer, pg. 60, Mar.
HEUER'S PERFECT PAIR by Jim Walker, pg. 41, Apr.
U.S. DIVERS' CONSHIELD SUPREME by George Cozens, pg. 48, Apr.
SEA HUNTER XS500 by Geni Murphy, pg. 52, Apr.
THE AVON S4.60 by Eric Hanauer, pg. 54, Apr.
DACOR'S VISTA MASK by Howard Hall, pg. 56, Apr.
SCUBAPRO'S MESH WEIGHTBELT by Jim Walker, pg. 98, Apr.
SCUBAPRO'S DELTA BOOTS by Jim Walker, pg. 55, May
NIKON'S RUBBERIZED BINOCULARS by Geni Murphy, pg. 65, May
IDI'S SCUBA STAR II REGULATOR by George Cozens, pg. 66, May
ZODIAC MARK III GRAND RAID by Eric Hanauer, pg. 72, May
FISHER PULSE 8 METAL DETECTOR by Jim Walker, pg. 74, May
LADY'S CASIO WATCH by Geni Murphy, pg. 78, May
IMPERIAL'S ISLANDER 200 WETSUIT by Bonnie J. Cardone, pg. 79, May
THE HENDERSON TROPICAL SUIT by Jim Walker, pg. 80, May
SCUBAPRO'S CRYSTAL SON OF THE GUN by Jim Walker, pg. 19, June
PARKWAY OCEAN JACKET by Howard Hall, pg. 53, June
SHERWOOD'S MAGNUM REGULATOR by George Cozens, pg. 54, June
THE ACHILLES SD 14 by Eric Hanauer, pg. 60, June
KEENE'S EASY TOTE DREDGE by Jim Walker, pg. 62, June
ANSWER MARINE'S DIVEMASTER by Steve Lucas, pg. 66, June
JBL'S COMPETITION MAGNUM SPEARGUN by Marty Snyderman, pg. 68, June
SCUBA SYSTEMS' TANK BAG by Bonnie J. Cardone, pg. 108, June
THE METZELER ELEPHANT by Eric Hanauer, pg. 84, July
SEAPRO'S ZEPHER by George Cozens, pg. 86, July
DUI'S ARGONAUT by Bonnie J. Cardone, pg. 88, July
THE SUPER DOLPHIN by Steve Lucas, pg. 90, July
SEAPRO'S SEACOMP CONSOLE by Geni Murphy, pg. 94, July
THE GUNSLINGER SPEARGUN by Howard Hall, pg. 95, July
SCUBAPRO'S LIGHTNING JET FINS by Bonnie J. Cardone, pg. 96, July
FRANZUS ELECTRICAL CONVERTERS by Geni Murphy, pg. 100, July
CHRONOSPORT'S GOLDEN DIVE WATCH by Bonnie J. Cardone, pg. 31, Aug.
DACOR'S TURBOFLEX FIN by Howard Hall, pg. 33, Aug.
TEKNA'S T-2100B REGULATOR by George Cozens, pg. 34, Aug.
PRO-LINE'S 23 WALKAROUND by Steve Lucas, pg. 36, Aug.
WHITES' PI 1000 METAL DETECTOR by Bonnie J. Cardone, pg. 38, Aug.
EUROVINIL E 4 INFLATABLE by Eric Hanauer, pg. 44, Aug.
CAVALERO LINE GOBBLER by Eric Hanauer, pg. 46, Aug.
SEAQUEST SEAVEST by Jim Walker, pg. 47, Aug.
U.S. DIVERS' MISTRAL XL SNORKEL by Geni Murphy, pg. 48, Aug.
SUBSALVE LIFT BAG by Geni Murphy, pg. 82, Aug.
AQUASEAL by Jim Walker, pg. 110, Aug.
TABATA'S GAUGE CONSOLE by Howard Hall, pg. 33, Sept.
DACOR'S PACER 950XL REGULATOR by George Cozens, pg. 34, Sept.
BATTERY GUIDE, PART I by Jim and Cathy Church, pg. 36, Sept.
AMPAC INFLATABLE by Eric Hanauer, pg. 40, Sept.
AQUA-CRAFT'S TRAVEL SPEAR by Marty Snyderman, pg. 44, Sept.
SCUBAPRO'S CRYSTAL FUTURA MASK by Geni Murphy, pg. 45, Sept.
THE DUSKY 233 by Steve Lucas, pg. 46, Sept.
GARRETT'S XL500 METAL DETECTOR by Jim Walker, pg. 48, Sept.
U/W METAL DETECTING FOR TREASURE by Patrick J. Smid, pg. 92, Sept.
SCUBA SYSTEMS' FLIGHT BAG by Bonnie J. Cardone, pg. 99, Sept.
ZODIAC'S MARK II INFLATABLE by Eric Hanauer, pg. 40, Oct.
THE WATERLUNG W-250 REGULATOR by George Cozens, pg. 42, Oct.
BATTERY GUIDE, PART II by Jim and Cathy Church, pg. 44, Oct.
SEACRAFT'S SPORT DIVER 20 by Steve Lucas, pg. 46, Oct.
TEKNA'S T-1100S MASK by Marty Snyderman, pg. 48, Oct.
DUI'S HOT WATER SUIT by Howard Hall, pg. 22, Nov.
SLIDE SHOW GEAR PART I by Jim and Cathy Church, pg. 42, Nov.
CRESSI-SUB'S PIUMA SILICONE MASK by Bonnie J. Cardone, pg. 46, Nov.
DACOR'S CLEAR TURBO VENT SNORKEL by Marty Snyderman, pg. 49, Nov.

CAMPWAYS SEA WIND 12 by Eric Hanauer, pg. 50, Nov.
RAELAR'S METAL DETECTOR by Jim Walker, pg. 52, Nov.
U.S. DIVERS' ROYAL AQUA-LUNG by George Cozens, pg. 54, Nov.
UNDERWATER KINETICS' SUPER QX-LITE by Marty Snyderman, pg. 104, Nov.
AQUA-CRAFT'S GOLD OMEGA KNIFE by Bonnie J. Cardone, pg. 108, Nov.
HEUER POSPHORESCENT WATCH by Bonnie J. Cardone, pg. 41, Dec.
OCEANMASTER REGULATOR by George Cozens, pg. 44, Dec.
RADIAL 955 R INFLATABLE by Eric Hanauer, pg. 46, Dec.
EFCOM SC-100M UNDERWATER COMMUNICATOR by Howard Hall, pg. 48, Dec.
SCUBAPRO DIVE LIGHTS by Jim Walker, pg. 51, Dec.
ANGLER V-22 DIVE BOAT by Steve Lucas, pg. 52, Dec.
WATERLUNG SNAPPER GOODIE BAG by Marty Snyderman, pg. 54, Dec.
AUTOMARINE MARKER BUOY by Howard Hall, pg. 55, Dec.
THE SEASPORT ROLLER TANK BOOT by Eric Hanauer, pg. 56, Dec.

DIVE MEDICINE

BARODONTALGIA by Kenneth Rottman, D.D.S., pg. 6, Feb.
SURVIVAL MEDICINE FOR A DIVE VACATION by M. Grossan, M.D. and B. Grossan., pg. 22, Mar.

EDITORIALS by the Publisher

WINTER FITNESS, pg. 4, Jan.
DIVERS DON'T DO DRUGS, pg. 4, Feb.
COMING OUT OF HIBERNATION, pg. 4, Mar.
SPRING CLEANING FOR YOUR BREATHING MACHINE, pg. 4, Apr.
SUMMERTIME, SUMMERTIME!, pg. 4, May
HOW DO YOU MEASURE UP?, pg. 4, June
BUDDY BREATHING OUT/OCTOPUS IN, pg. 4, July
THE DIVER'S OATH, pg. 4, Aug.
AN INSIDE LOOK AT SDM'S EQUIPMENT REPORTS, pg. 4, Sept.
PAINTING YOUR TANK CAN BE HAZARDOUS, pg. 4, Oct.
AN INSIDE LOOK AT SDM'S TRAVEL ARTICLES, pg. 4, Nov.
KEEPING SCUBA SAFE, pg. 4, Dec.

FISH OF THE MONTH

THE REDEYE TRIPLEFIN Hauser/Humann, pg. 54, Jan.
THE LONGNOSE FILEFISH Hauser/Newbert, pg. 26, Feb.
THE YELLOWWEY ROCKFISH Hauser/Lehmann, pg. 46, Mar.
THE BAY BLENNIE Hauser/Kerstitch, pg. 62, May
THE YELLOWTAIL STINGRAY Hauser/Humann, pg. 104, Aug.
THE PYRAMID BUTTERFLYFISH Hauser/Newbert, pg. 86, Sept.
THE TURKEYFISH Hauser/Roessler, pg. 74, Oct.
THE THREEBAND BUTTERFLYFISH Hauser/Kerstitch, pg. 38, Nov.
THE FALSE MOORISH IDOL Hauser/Roessler, pg. 66, Dec.

FOREIGN TRAVEL

THE PHILIPPINES by Lynn Funkhouser and Paul Schutt, pg. 28, Jan.
BRITISH COLUMBIA by Jack McKenney, pg. 60, Jan.
DIVE BELIZE ON THE ISLA MIA by Carl Roessler, pg. 67, Jan.
KLEIN BONAIRE by Rick Frehsee, pg. 68, Jan.
CAYMAN TRAVEL GUIDE by Geni Murphy, pg. 65, Feb.
GUYMAS by Beverly Dalby, pg. 91, Feb.
KING CHRISTIAN HOTEL by Stephen Frink, pg. 92, Feb.
RUM CAY CLUB by Geni Murphy, pg. 100, Feb.
THE MOHAWK II by Jim and Cathy Church, pg. 67, Mar.
FANTASIA DIVERS by Rick Frehsee, pg. 68, Mar.
SCUBA CRUISING THE CARIBBEAN by Stephen Frink, pg. 78, Mar.
BAHAMAS BOUND by Steve Lucas, pg. 96, Mar.
VOLCANIC VANUATU'S COLOSSAL SS COOLDIDGE by Carl Roessler, pg. 79, Apr.
BONAIRE by Geni Murphy, pg. 58, May
THE MALDIVES by Eric Hanauer, pg. 89, May
RANGIROA by Rod Canham, pg. 90, May
ROMORA BAY CLUB by Rick Frehsee, pg. 96, May
NEW GUINEA'S B25 BOMBER by Bob Halstead, pg. 77, June
RIDING ROCK RESORT by Geni Murphy, pg. 78, June
M/V TROPIC BIRD by Stephen Frink, pg. 88, June
CURACAO by Rick Frehsee, pg. 96, June
AUSTRALIA TRAVEL GUIDE by Geni Murphy, pg. 33, July
NASSAU by Rick Frehsee, pg. 103, July
SCUBA BOWL II by Geni Murphy, pg. 50, Aug.
BAHAMAS TRAVEL GUIDE by Geni Murphy, pg. 57, Aug.
HAWAII WITH CENTRAL PACIFIC DIVERS by Jim and Cathy Church, pg. 89, Aug.
SMUGGLER'S REST RESORT by Stephen Frink, pg. 65, Sept.
NEW ZEALAND by Stephen Frink, pg. 70, Sept.
THE BRITISH VIRGINS by Rick Frehsee, pg. 82, Sept.
TOBAGO by Bill Gleason, pg. 57, Oct.
THE TURKS AND CAICOS by Stephen Frink, pg. 68, Oct.
BIMINI by Rick Frehsee, pg. 84, Oct.
THE BAY ISLANDS OF HONDURAS by Rick Frehsee, pg. 57, Nov.
CAYMAN BRAC DIRECT by Steve Lucas, pg. 75, Nov.
SOTO'S SILVER ANNIVERSARY by Rick Frehsee, pg. 80, Nov.
FJI by Carl Roessler, pg. 73, Dec.
DIVE BONAIRE by Rick Frehsee, pg. 80, Dec.
HAITI by Rick Frehsee, pg. 92, Dec.

LOCAL DIVING

VENTURE NORTH FOR WRECKS by Todd S. Parkhurst, pg. 83, Jan.
UNDERWATER LUMBERJACKS by John P. Baker, pg. 108, Jan.
MIDWEST MECCA by Roger Kicker and Boyd Meyers, pg. 110, Jan.
CALIFORNIA'S CHARISMA AND CONCEPTION by Bonnie J. Cardone, pg. 42, Apr.
FLORIDA KEYS by Rick Frehsee, pg. 57, Apr.
LAKE LANIER by Scot Smith, pg. 52, May
SUPERIOR DIVING by Jerry Eliason, pg. 82, May
DIVE THE FLORIDA KEYS BRIDGES by Fred Harper, pg. 112, May
IT'S THE PITS by Rod Canham, pg. 40, June
SHIPWRECKS OF CAPE ANN by Paul H. Sherman, pg. 110, July
CAPE COD WRECKS by Joseph Amaral, pg. 113, Aug.
CALIFORNIA'S SANTA CRUZ ISLAND by Alan Heller, pg. 30, Sept.
FT. LAUDERDALE by Al Hornsby, pg. 64, Oct.
BOAT DIVING THE FLORIDA KEYS by John E. MacNitch, pg. 104, Oct.
FOSSIL DIVING by Scot Smith, pg. 19, Nov.
THE SCITUATE TRIANGLE by Wally Westphal, pg. 92, Nov.
PENNEKAMP PARK by Stephen Frink, pg. 58, Dec.

MARINE LIFE

THE MAGNIFICENT MELIBE by Jack and Sue Drafihi, pg. 18, Jan.

(Continued on Page 119)

SEAGRAM DISTILLERS CO., N.Y. BLENDED CANADIAN WHISKY. 80 PROOF.



My sock runneth over.

In a short period of history, thousands of submarines have been built, almost exclusively as combat vessels. Many have been lost in action. A few have suffered peacetime disasters in which all hands were lost. Even fewer have been sunk but with some of the crew escaping or being rescued. One such disaster was the sinking of the *USS Squalus* off Portsmouth, New Hampshire on May 23, 1939.

This is the story of the *Squalus* and how the heroic efforts of a few men saved some of their shipmates and of the divers who rescued those men from a depth of 242 feet of bitterly cold water.

The *Squalus* was the Navy's newest S-type submarine, 310 feet long and designed for fleet service. She displaced 1450 tons and had been constructed at the Portsmouth Navy Yard. She was launched there on September 14, 1938 and commissioned in March of 1939. Full scale sea trials were started on May 15.

One test the boat had to pass for acceptance was to go from cruising on the surface, under simulated war time conditions at full speed (about 16 knots), to a depth of 50 feet in 60 seconds. A few days earlier she had missed passing this crash dive test by five seconds.

Early on the bright sunny Tuesday morning of May 23, Lieutenant Oliver Naquin, captain of the *Squalus*, got his vessel underway and proceeded out into the choppy North Atlantic to a stretch of deep water off the Isle of Shoals to try to put the *Squalus* through this test successfully.

When operating on the surface the *Squalus* was powered by four diesel engines that drew air for their operation from a 31 inch diameter main induction valve and piping system, the opening of which was high up under the bridge deck just aft the conning tower. A second air induction system, this one 18 inches in diameter, provided air for the crew compartments throughout the boat when it was on the surface. Valves that closed these air induction systems were operated by a man in the control room.

Small, heavy doors, each only two and one-half by three feet, in all watertight bulkheads, were open but guarded by a man whose sole duty was to close the door quickly if an emergency developed. At operation stations throughout the boat telephone talkers were in direct communication with the captain's talker in the control room.

At 0813 Lt. Naquin sent a radio message to the Navy Yard telling them where he would start his test dive. The *Squalus* carried 56 experi-

enced Navy personnel and three civilian technicians from the Navy Yard; a total crew of 59.

At 0839 all hands had reported at their dive stations ready for diving. Lt. Doyle, the executive officer, was in the control room with the team of ten men it took to operate the many valves and fittings required to keep the *Squalus* cruising under war time conditions. He reported to Lt. Naquin, who was still on the bridge, that the boat was ready for diving. The captain informed the Navy Yard advising that he was on station and preparing to submerge for one hour.

In the control room, the "Christmas tree," an array of lights showing the condition of dozens of valves, fittings, and openings throughout the boat (red lights for open, green lights for closed) showed all green except eight red lights; four for the exhausts for the engines, one for the flapper valve through which the radio antenna rose, and one for the conning tower hatch leading to the bridge where Lt. Naquin and two men remained. The final two red lights were for the two high induction valves that would remain open until the *Squalus* began her glide below the surface.

Still on the bridge, Lt. Naquin gave the order, "Stand by to dive."

The loud blare of the klaxons gave the crew the first warning of the dive. Then, following the two crewmen, Naquin slipped through the hatch leading below to the conning tower and, with the help of one man, closed and dogged it. One red light on the control panel went out and one green light came on. In the radio

room the radioman completed sending the dive information message and retracted the radio antenna. A green light replaced another red light. The skipper dropped down the ladder into the control room.

Time: 0840 and 0 seconds.

Lt. Naquin gave the order, "Take her down," and started his stopwatch. The second blare of the klaxons warned the crew the boat was on her way down.

0840 and 5 seconds.

Control Room—The diving officer already had bow planes placed at hard dive so the bow would be dragged down. He now ordered, "Flood number one and two main ballast tanks." The flooded tanks would provide neutral buoyancy so the bow planes could do their job.

0840 and 10 seconds.

Control Room—The diving officer ordered flood valves open on number three and four main ballast tanks leaving vents closed. When the Christmas tree indicated the boat was tight he would open the vents. Cruising power was now shifted to electric motors and the four diesels were shut down and their exhausts closed. Four more lights went from red to green. Only two lights remained red; the two high air induction valves were still open. Alfred Prien, operating the control board, now pulled the two levers that caused the air induction valves to close. The last two red lights winked out and green lights flashed on. The board indicated the boat was tight.

0840 and 25 seconds.

Control Room—Lt. Doyle ordered vents opened on number three and four main ballast tanks. Depth gauges read 28 feet and five seconds later, 30 feet.

0840 and 40 seconds.

Control Room—Depth, 40 feet.

0840 and 50 seconds.

Main Induction Valves—Water was over the top of the two valves. The 18 inch valve was closed but the 31 inch main valve had not closed; it was wide open and water was rushing into the valve and through the piping toward the engine room and after compartments.

0841 and 0 seconds.

Control Room—Depth gauges read 50 feet. Lt. Naquin and the civilian technician stopped their watches and the skipper was congratulated. He had made his 60 second dive.

Engine Room—The telephone talker screamed into the telephone, "Water flooding engine room."

0841 and 5 seconds.

Control Room—Further word came from the engine room. "Induction opened. Take her up." Lt. Naquin ordered, "Blow all ballast."

DEEP RESCUE

Heroic Rescue of *Squalus* Submariners by Divers

BY E.R. CROSS



Then he added, "Blow all buoyancy."

0841 and 15 seconds.

Control Room—The stern of the *Squalus* was now settling rapidly. Lt. Naquin ordered full power on the electric motors. The boat steadied for a moment, then continued to settle by the stern. Alfred Prien, at the controls, was still trying to pull the lever controlling the main induction valve farther back. It was as far as it would go. All lights were still green.

Forward Torpedo Room—Lt. Nichols and his crew closed watertight doors leading from their compartment. They were sealed in.

After Engine Room—Lloyd Mannes, guard at the bulkhead door between the engine room and the control room, suddenly saw a head of water racing toward his station. He started to close the door.

0841 and 30 seconds.

Control Room—Ten men and two officers frantically operated all valves and fittings, trying desperately to bring the stricken *Squalus* back to the surface. The stern of the vessel was now down nearly 30 degrees and still sinking. The electric drive motors slowed to a stop, shorted out by the rising salt water. The lights on the Christmas tree, still all green, flickered and went out. The *Squalus* was going to go all the way to the bottom.

Engine Room—The telephone talker screamed, "Take her up. Take her up. Water flooding...." The telephone system went dead.

Forward Battery Compartment—Chief Gainer secured his watertight door sealing himself in the electric control room above the battery compartment. His instruments showed a dead short in the system. At the risk of his life he opened the hatch and climbed quickly down into the battery compartment. Great blue flames of electricity were flashing across batteries and fittings. It was so hot the rubber cases of the batteries were melting. If that happened they could explode with enough force to blow the sub to bits. In the midst of the heat and flashes of electricity, he managed to pull the two main switches. Lights, already dim and flickering, went out in the forward compartments of the *Squalus*.

Engine Room—Lloyd Mannes, in the act of closing the watertight door, saw four men struggling through rising water trying to reach safety. He waited. First Radioman Arthur Booth made it through.

0841 and 40 seconds.

Engine Room—Blanchard made it through the door into the control room. Isaacs was still fighting forward. Mannes reached out and pulled him sprawling into the control room. Half swimming through the rising water, Pharmacist's Mate Raymond O'Hara, still ten feet away from the door, screamed, "Leave it open. Leave it open." Slipping and falling through the rising water, he was just able to grasp the hatch combing and pull himself through into the control room. Now,

with water lapping over the raised hatch combing, Mannes had to literally lift the 200 pound steel door closed since the *Squalus* was now bow-up at about a 40 degree angle.

0841 and 50 seconds.

Control Room—A flashlight was held up to the glass port in the door Mannes had just closed. Oily water crept up and across it. The sub was passing 90 feet, still bow up at about 45 degrees.

0843 and 0 seconds.

Control Room—All lights were out. Emergency lanterns and flashlights provided a dim glow in the control room. *Squalus* was passing 185 feet, then 200 and 220.

0845 and 0 seconds.

Control Room—The *Squalus* gently touched the muddy bottom stern first and a few seconds later the bow settled into the mud at a depth of 242 feet.

Lt. Naquin tried to reach each after compartment by emergency sound powered telephone. There was no reply. He next tapped on the closed forward battery room door. There was an answering tap and the door was slowly opened. "How is the forward torpedo room," the skipper asked. Someone answered, "All dry and doors secured, sir." That was that. The control room and the two forward compartments were dry. There were 28 crewmen, three officers and one civilian technician alive in the forward compartments. Apparently all compartments aft were flooded. There were 23 crewmen, one officer and two civilian technicians in those compartments.

Lt. Naquin now began emergency procedures from within the sunken *Squalus* that might make rescue possible. First he ordered the release of the forward telephone rescue buoy. The release lever was pulled and the buoy floated to the surface on the end of 325 feet of steel wire. Next, a red smoke bomb was released. This floated to the surface, bobbed clear of the water, then splashed back leaving a thick red smudge of smoke spreading over the water. Now all they could do was wait.

Inside the sub were cylinders of oxygen for breathing and soda lime to absorb exhaled carbon dioxide. For the present, Lt. Naquin ruled out using the individual Momsen escape lungs because of the extreme depth and the cold. Inside the sub the crew could survive for up to five days. But it was going to be a very cold wait. The water temperature outside was 30°F. The submarine had no power, no heat and only one small emergency locker of food. A ten gallon can of emergency water was stowed in each compartment. Air was their most precious resource. To conserve this as much as possible each crew member was assigned a spot in the boat, given blankets for warmth, and told to lie down and to limit talking to essential orders.

By 1100, operation officers at the sub

base where worrying about not having heard from the *Squalus*. They reported this to the commandant of the yard who then initiated emergency procedures to try to locate the *Squalus*. The *Sculpin*, sister ship to the *Squalus*, was ordered to sea to locate the missing sub.

At 1240, four hours after the dive started, a sixth smoke bomb was released. On board the *Sculpin*, Lt. Denby glanced back in the direction from which they had come and saw the smoke. The *Sculpin* made a quick turn and headed in that direction. Soon the crew of the *Sculpin* spotted the telephone and rescue buoy. The men in the *Squalus* heard the sounds of the *Sculpin's* propellers and another smoke bomb was released, this one spreading the red smudge directly in front of the *Sculpin*. Carefully the *Sculpin* was brought alongside the telephone buoy and it was lifted aboard. For half a minute they were in direct communication with the crew in the forward torpedo room of the *Squalus*. Then the bow of the *Sculpin* surged up on a wave and the buoy cable and telephone line parted.

By 1245 the Navy Department had been informed of the *Squalus* disaster and immediately one of the biggest submarine rescue and salvage operations in naval history began to unfold. Divers and salvage personnel and crews of salvage ships and tugs were recalled to their vessels. The ASR (submarine rescue vessel) *Falcon* got steam up and headed toward the sunken *Squalus* under forced draft. On deck was the McCann submarine rescue bell that had been developed after the *S-4* disaster in 1927. Commander McCann was on board to be in charge of bell rescue if this was required. Lieutenant Commander Momsen was detailed to the rescue to supervise escape via the escape lungs which he had developed, if this was the chosen method of rescue. Lieutenant Behnke, Navy medical officer and dive accident specialist was also on board. Fourteen divers and a diving officer had arrived from Newport just as the *Falcon* was leaving the dock. These 14 divers, plus seven in the ship's company, would be the initial diving team. The tug *Penacook*, with Admiral Cole aboard, left Portsmouth for the one hour run to the site of the sinking. The large tug *Wandank* was next to reach the scene. She used her oscillators to try to communicate with the *Squalus* while the *Penacook* began dragging a heavy grapnel that eventually hooked onto the sub. During the night the rescue fleet continued to grow: a cruiser, two Coast Guard patrol boats, the tug *Chandler*, and, at daybreak, a patrol plane that circled overhead to try to spot any of the crew that might escape from the *Squalus* with escape lungs.

Before dawn on May 24, the rescue vessel *Falcon* arrived with the divers and the rescue chamber on board. The commanding officer, Lieutenant George

Sharp, worked in dark, stormy conditions to lay a six anchor, chain and buoy mooring system that would securely hold the rescue vessel directly over the sunken *Squalus*. By 0646 the rescue vessel completed her moor. Twenty-two hours had passed since the *Squalus* had touched on the bottom.

In the *Squalus*, cold was beginning to affect the crew. Temperature inside the vessel was already down to 46°F. Men who had been in the water as they escaped from the after engine room into the control room—Isaacs, Blanchard, Mannes, and O'Hara—were suffering

cal wiring and telephone cables. A hatch in the top permits entry and exit of the operators and rescued personnel. Between the upper and lower compartments a second hatch permits access into the lower, open end of the bell and thus into or out of the sunken submarine when the bell is mated to the escape hatch. All operating valves and fittings are located in the upper compartment of the chamber. An air driven motor pulls the bell down to the submarine by reeling in a wire previously attached to the submarine escape hatch bail by a diver. Usually the chamber operates at atmospheric

winch." Now he turned to face aft. The grapnel had snagged just six feet from the torpedo room escape hatch through which the trapped submariners must escape. He reported this to the surface and asked them to send him the rescue bell downhaul cable. Sibitzky stamped his lead soled shoes on the deck to let the crew of the *Squalus* know he was there. Answering bangs on the hull with a hammer told him some of the crew were alive and just a thin metal hull away from him. He got some slack in the downhaul cable, unscrewed the shackle pin, placed the open end over the bail of the escape

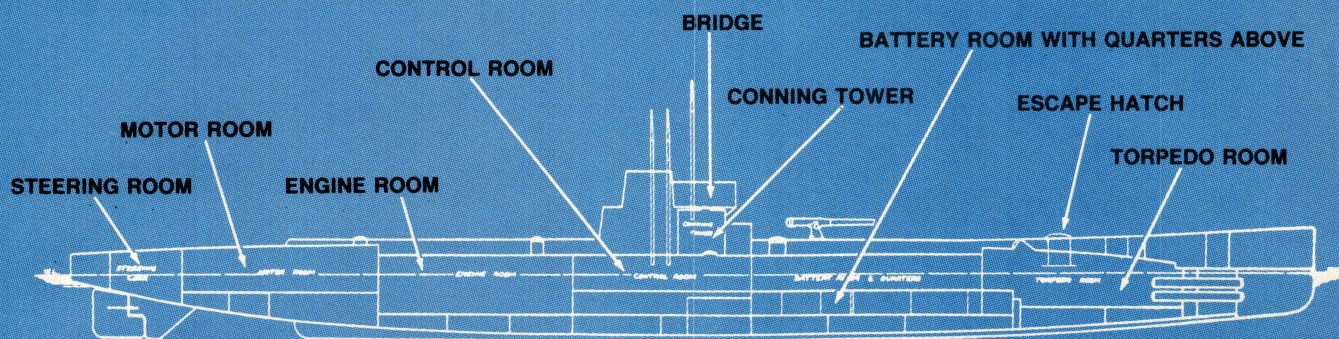


Diagram of a *Squalus* type submarine. The *Squalus* was 310 feet long and displaced 1450 tons. While on a crash dive test on May 23, 1939 she flooded and sank in 242 feet of water. The survivors of the tragedy were the first ever rescued from a sunken submarine.

most from the intense cold. Lieutenant Naquin gathered up all the blankets available, and gave one of the men his own jacket for warmth. All were listening intently—and apprehensively—to the sounds of the rescue ship and gear working over their sunken boat.

On board the *Falcon* conventional surface supplied helmet dive gear was being rigged. The *Falcon* was also supplied complete sets of dive equipment for using the recently developed mix of oxygen and helium as a breathing gas. However, while this mix had been used experimentally several times by many of the rescue divers no diver had ever used it under the conditions of depth, cold and urgency now facing the salvage and rescue personnel. The divers, and rescue officials, felt it was better to go with equipment and breathing gas they knew the most about.

While the diving gear was being readied for the first dive to the *Squalus* other crew members were rigging the McCann submarine rescue bell. This is a steel device about 11 feet tall and weighing 18,000 pounds. It has a maximum outside diameter of nearly eight feet, tapering at the bottom to five feet. The bottom of the bell is open and, in a groove, has a rubber gasket which seals on a skirt around the escape hatch of the submarine. The chamber is divided into three compartments; the upper or control compartment, the lower compartment, and the ballast tanks. Necessary fittings and connections are found on the top outside hull for air supply and vent hoses, electri-

pressure since the internal compartment of a submarine from which the crew is to be rescued will also be at atmospheric pressure, or nearly so.

By 1010 Martin Conrad Sibitzky had been dressed in his 200 pounds of air-supplied helmet gear. He was a good choice for this difficult dive. He was young, tough and experienced. He had made many practice dives in connection with hooking up the rescue bell and knew just what he had to do. But, he had never made a working dive in 242 feet of cold water before.

At 1012 he was hoisted over the side of the *Falcon* into the water and worked his way forward to the cable leading up from the grapnel snagged on the *Squalus*. He checked his gear and left the surface. At 1017, his heavy shoes landed with the dull thud of lead on steel. Sibitzky knew he was on the deck of the *Squalus*. But where?

Visibility was much better than anyone thought it would be. He could see 30 to 40 feet in all directions. He needed good visibility. Cold numbed his touch and narcosis his thinking, and so much depended on his observations and reports to topside salvage and rescue personnel.

Sibitzky turned slowly around, mentally absorbing everything within sight. In the slurred voice of a man at great depth on air he reported, "I've landed on the submarine," he told his talker topside, "I am on the bow of the *Squalus*." Then he leaned over to look at an object on deck. "I am looking at the forward anchor



John Mihalowski (bell operator for the *Squalus* rescue) and author (right), 1950.

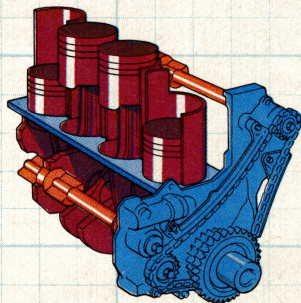
hatch and replaced the shackle pin, securing it with a safety wire to prevent loss. Over the telephone he reported, "Job completed." He received three pulls on his lifeline telling him to stand by to come up and, when he answered, four pulls told him he was going to be pulled up. His feet cleared the deck of the *Squalus* at 1039, he reached the surface at 1124 and was placed in the recompression chamber for further decompression.

The McCann rescue bell was ready. At
(Continued on Page 116)

1983 CHALLENGER NOW IT'S OUR M



Fighting fire with fire, Dodge Challenger and Plymouth Sapporo are two sporty road-handlers built by Mitsubishi Motors Corporation, Master Car Builders of Japan. With their slinky, out-of-the-night looks, their high-tech electronics, nimble-footed hustle and long list of standard equipment, they don't give an inch to Toyota Celica GT and Datsun 200-SX. With such comfort and convenience refinements as reclining buckets with adjustable lumbar support for the driver and memory return on the passenger side. Remote-controlled electric dual outside mirrors. Locking fuel filler; door with inside remote control. And digital clock, all just for starters. But a few other items



really stop the competition cold. For example, the patented Silent Shaft system of engine counter-balance that makes the Challenger and Sapporo so free of engine noise and vibration that it's startling to barrel along at highway speed without "feeling" the engine. Cliches like "smooth" and "comfortable" and "solid" rush understandably to mind. And with a bigger engine than Toyota Celica

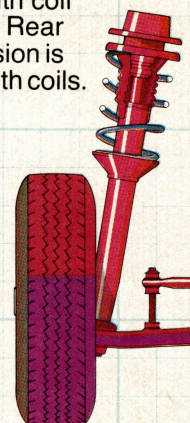
GT or Datsun 200-SX, a 2.6 liter SOHC 4-cylinder power plant, they post the kind of mileage numbers you'd never expect from performers like these: 36 estimated highway, [24] EPA estimated MPG.* The seeming contradiction between power and economy is resolved by the design of the MCA-Jet engine, with a third valve in each cylinder



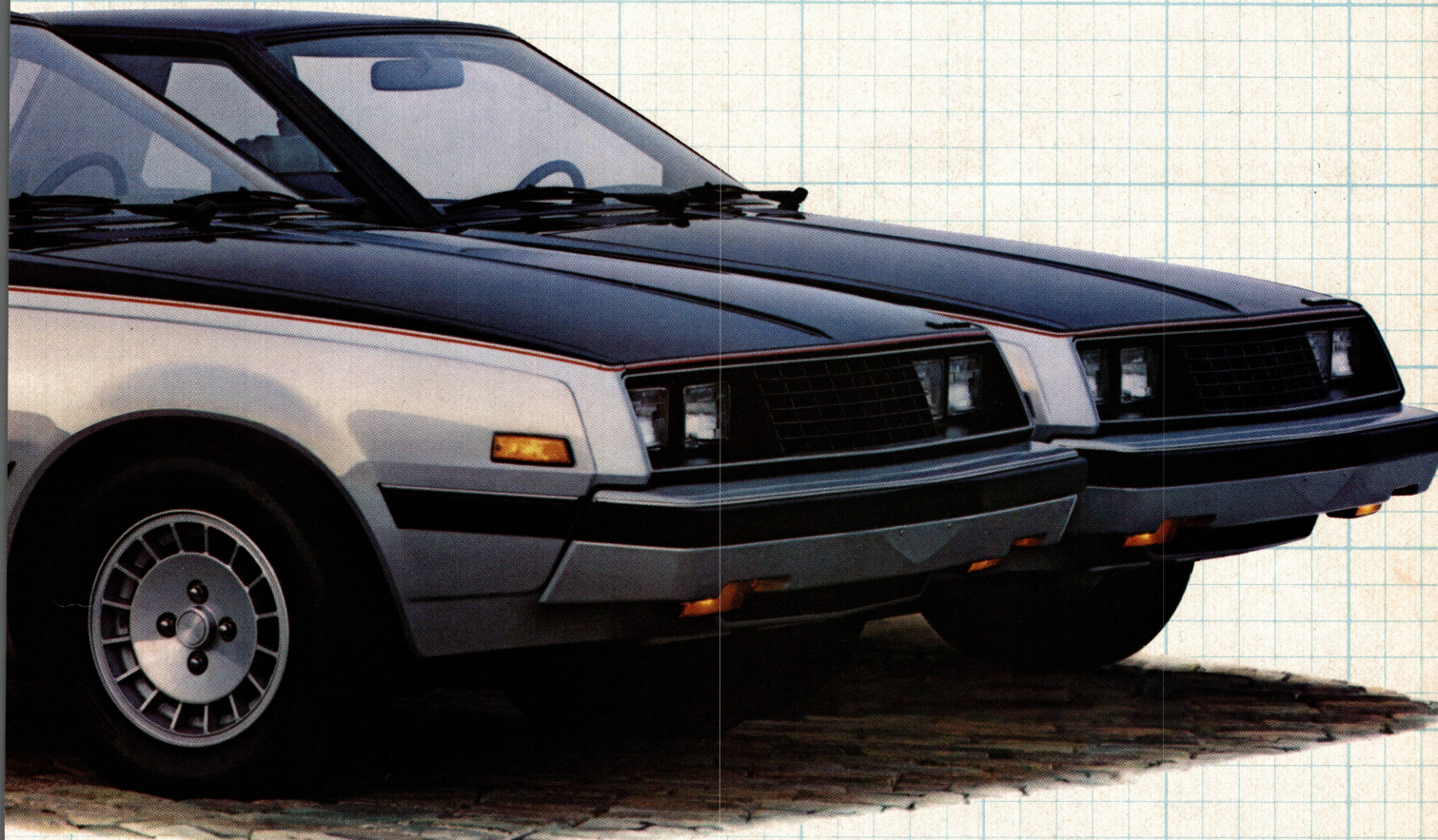
as an air-injection valve, leaning down the mixture as it swirls in the hemi-

spheric combustion chamber, and by a standard 5-speed transmission that packs a surprising 0.856:1 overdrive ratio in fifth gear.

The solid road-handling characteristics of both Challenger and Sapporo derive largely from independent front suspension combining MacPherson struts with coil springs. Rear suspension is 4-link with coils.



R AND SAPPORO. IMPORTS VS. THEIRS.



For 1983, both cars are available with a new high-tech electronics package called TECHNICA, featuring a dazzling variety of instruments to inform, analyze and record data in unusual ways. A digital speedometer reads out in numbers, not in the spin of a needle. A tachometer vividly charts RPM's on a graph, in glowing color keyed to the power curve. Temperature and air flow are constantly monitored by color graphic displays. And to remind you to do things you sometimes forget, such as putting out your headlights, removing

your ignition key, and setting your parking brake, TECHNICA's Electronic Voice Alert System speaks to you gently. (That black over silver exterior in our picture is another piece of TECHNICA distinction.) Challenger. Imported

for Dodge. Sapporo. Imported for Plymouth. Backed and serviced by more than 3,600 Dodge and Plymouth Dealers across the country. With all this going for you, 1983 is the year to re-think your import car preferences, and go see your Dodge or Plymouth Dealer.

Because now it's our imports vs. theirs.

*Use EPA estimated MPG for comparison. Actual mileage may vary. Highway mpg will probably be lower. California mileage lower.

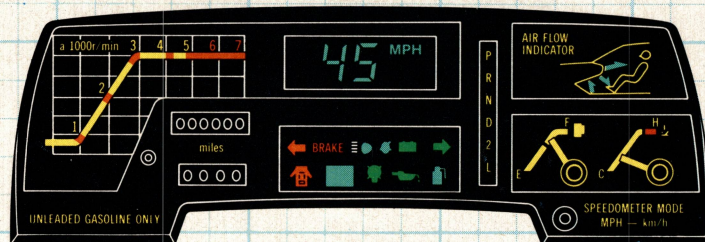
Buckle up for safety.



HIGH-TECH IMPORTS

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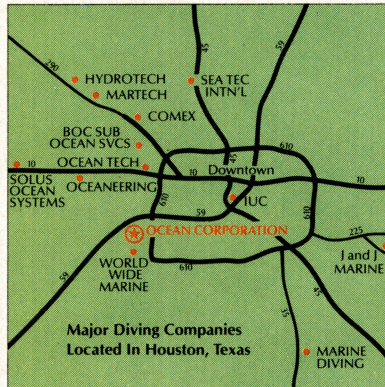
The New Chrysler Corporation



Why Houston?

BECAUSE

The Ocean Corporation is located in Houston and more commercial divers are hired in Houston than in any other place in the world. Twelve diving companies are located in Houston including three of the four largest in the U.S. Many others are located in the nearby New Orleans area. The demand for divers is so great in Houston that large locally based diving companies like Ocean Systems, Hydrotech Systems, Martech International and Sea Tech International have hired many of our students for part-time work while they were attending school. Over 90% of our recent graduates went to work for these and other local diving companies when they completed our program. Houston is the place where the action is...the commercial diving, offshore construction and oil industry capital of the world.



BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible...



because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size

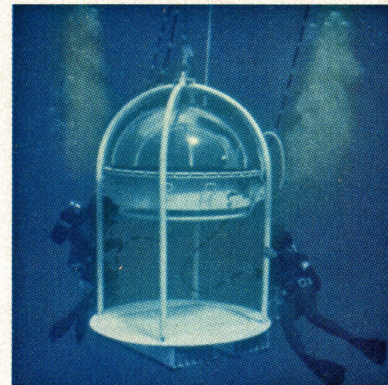


country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.

BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean Corporation, Larry

Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



The Ocean Corporation

5709 Glenmont • Houston, Texas 77081

If you are interested in becoming a commercial diver, please write and ask for our free information package on job opportunities, our school and our super city. If you'd rather call, make it collect and ask for Admissions Department (713) 661-0033.

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skin diver's dive equipment **CHECKLIST**

Get Your Act and Your Gear Together

BY BONNIE J. CARDONE

It happened last year and I am still trying to live it down. I was on a California charter dive boat gearing up for my first dive. I attached my regulator to my tank and turned the air on, then got ready to don my wetsuit. Only trouble was, it wasn't in my gear bag—it was still hanging in my garage. The instructor who had introduced me to his class gave forth with great guffaws and made sure everyone on board knew of my predicament. When his students had finished their required dives, he persuaded one of them to loan me her rental wetsuit. Since the suit did not fit particularly well, it was not a particularly comfortable dive. The teasing I endured the rest of the trip (and still do everytime I run into this instructor) was not particularly comfortable either!

Admittedly, this wasn't the first time in eight years I had forgotten something. It was the first time, however, that what I had forgotten was not so easily borrowed. Even extra regulators are easier to come by than extra wetsuits in the right size. As a novice diver, I had made myself a checklist and used it religiously. I was worried about forgetting something that was indispensable and being unable to dive or, *looking* like a novice. As my confidence grew, so did my reliance on my memory. I became reasonably proficient at being properly geared simply because when I packed my gear bag I did so by mentally dressing myself in reverse. The items I put on last went into the bag first and the items I put on first went in last. This worked pretty well for a long time because I always kept my gear in a particular part of my tool shed and everything I owned was in sight as I packed. What reduced this system to a shambles was a move from one house to another. My gear was now stored in the garage and there was room to hang my wetsuit between dives. The time I left my suit at home I had packed, as always, everything in sight. The out-of-sight wetsuit remained out-of-bag!

I was embarrassed enough by this inci-

dent to make myself a new checklist. The one on these pages could be laminated and hung near your gear bag. Then, before each dive trip, you can go down the list and mark off the items with a grease pencil as you pack them. A cloth or tissue will wipe the marks off afterward.

The list on the next page is pretty long. You won't need everything on it and should modify it to meet your special needs. We left spaces at the bottom so you can add those items you don't want to be without. In general, the more experienced the diver, the more gear he/she is likely to carry. There are several reasons for this. If you stay in diving it is usually because you have developed a special interest, such as photography or game hunting, and these require more than basic gear. Also, the longer you dive the more minor "emergencies" you are likely to have. You learn to anticipate these and bring spare parts. Then, too, the longer you've been diving, the more likely it is that certain parts of your gear will need replacement. If you pay for a boat dive or get up early and drive to the beach, it is frustrating to be unable to dive because your fin strap broke and you have no replacement or your tank O-ring has fallen out and no one has an extra.

To make the list that appears on the next page, I looked at all the major log books and then added, deleted and rearranged the list to fit the type of diving I do. My gear falls into three different categories: Those items that go into my gear bag and I expect to get wet; those items I want to keep dry; and those items that can't be packed and are carried separately (such as camera bags, tank and weightbelt). The gear bag, tank and weightbelt remain on the deck of the boat at all times; the dry "bunkroom bag" in my bunk; the camera equipment in the galley (or bunkroom if there is space).

The gear bag list is organized so that most of the things I put on last are put in the bag first and are therefore on the bottom. Fins, gloves and goodie bag make

good buffers for less hardy gear. Really delicate items such as regulator, pressure gauge, depth gauge and mask are cushioned by wetsuit components. To protect them even further, you can pack some of the smaller items in the booties.

It is a good idea to mark all of your gear (even your bag) so you can recognize it instantly. It doesn't matter whether you sew cloth decals on it, spray paint it or hand letter your initials on it, but do mark it in an obvious way. This serves two purposes: It deters someone from walking off with your gear and it makes finding your gear easier when there are lots of other divers close by.

You can use our list to record the brand name, model and serial numbers of your gear for insurance purposes. Also, it could come in handy when you are traveling to a foreign country and need to register foreign made dive instruments and photographic equipment with U.S. Customs. All the information would be on the list and you would just need to copy it on Customs forms. If you are traveling to tropical waters, you can add those items you will need, but don't normally carry, to the bottom of the list to make sure you don't forget anything essential. Some of these extra items might include: insect repellent, Montezuma's revenge medicine, smaller net gear bag for tropical boat diving, etc.

In several years of boat diving I have observed a number of divers trying to borrow items they needed but left at home. Bathing suits and towels are often forgotten. Novice divers often have to borrow weights because what they have is insufficient. More experienced divers are likely to have to replace fin and mask straps that suddenly disintegrate as they are gearing up. All of this can be avoided if you use a checklist and inspect each piece of gear as you're packing for a dive. And, don't do this the night before you leave, do it early to allow yourself some leeway if you need to repair or replace something. 

SDM Dive Equipment Checklist

GEAR BAG

- ☐ Fins
- ☐ Gloves
- ☐ Goodie bag
- ☐ Abalone iron
- ☐ Lobster gauge
- ☐ Buoyancy compensator
- ☐ Wetsuit jacket
- ☐ Wetsuit pants
- ☐ Wetsuit hood
- ☐ Wetsuit booties
- ☐ Drysuit
- ☐ Drysuit hood
- ☐ Drysuit booties
- ☐ Mask & snorkel
- ☐ Regulator/pressure gauge
- ☐ Watch
- ☐ Compass
- ☐ Depth gauge
- ☐ Decompression meter
- ☐ No decompression tables
- ☐ Light(s)
- ☐ Knife
- ☐ Line & reel
- ☐ Slate & pencil
- ☐ First aid kit

BUNKROOM BAG

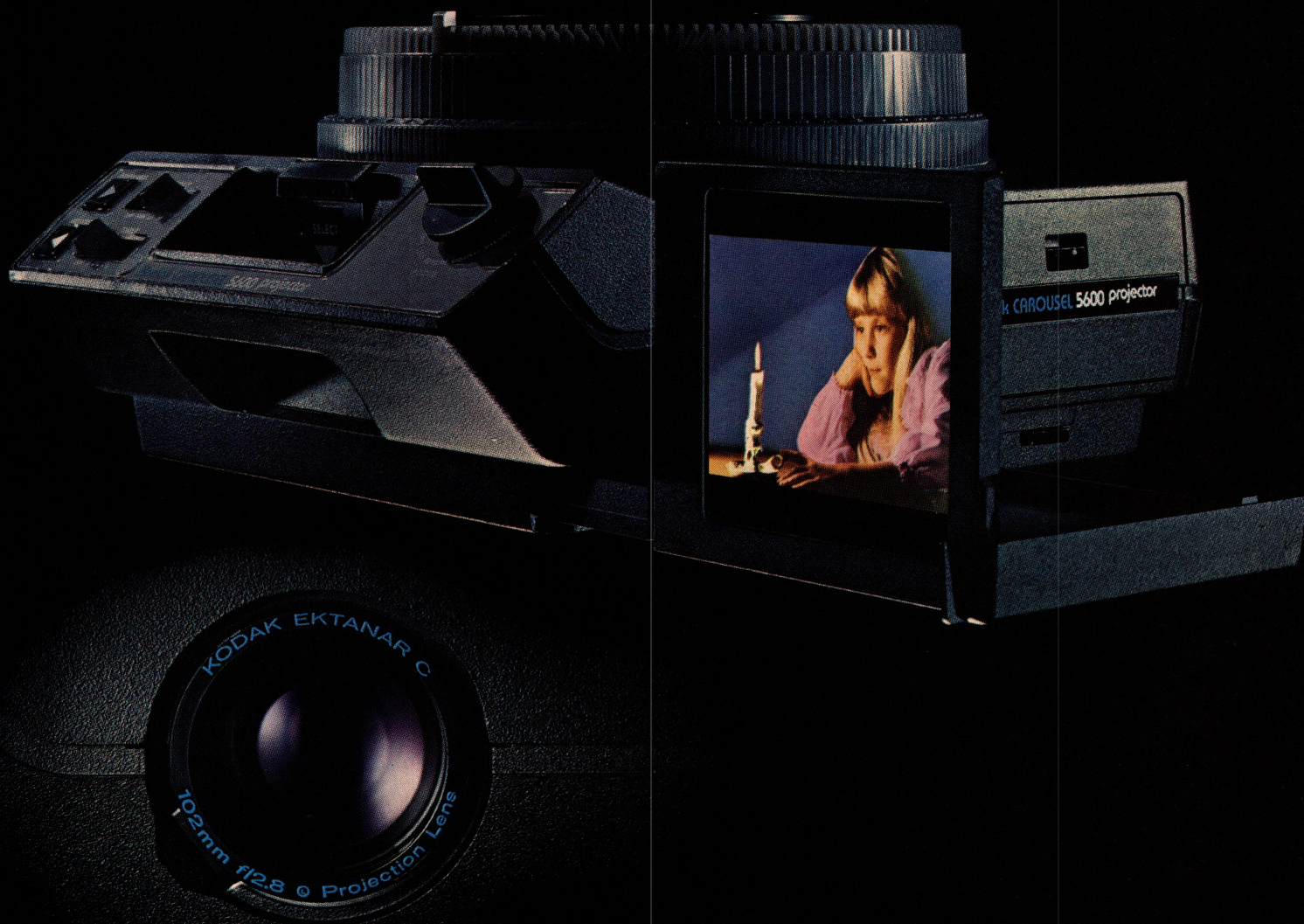
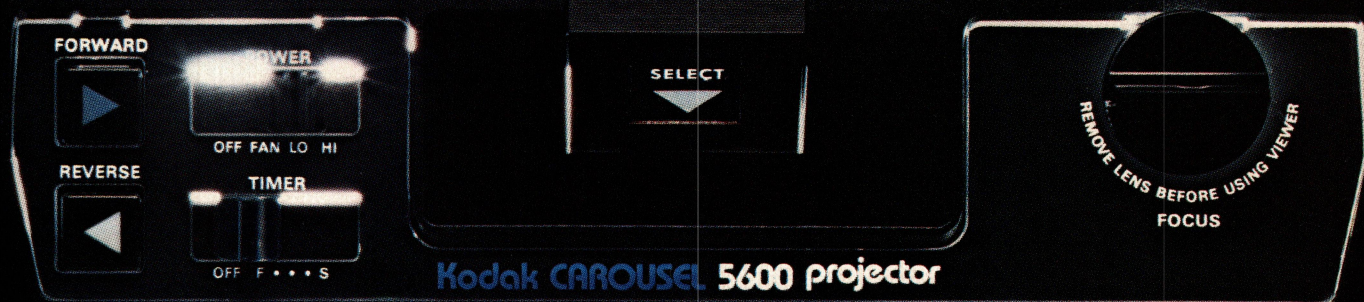
- ☐ Swimsuit
- ☐ Towel
- ☐ Fishing license
- ☐ Logbook
- ☐ Sunglasses
- ☐ Hat
- ☐ Suntan lotion
- ☐ C-card
- ☐ Money, including dimes
- ☐ Jacket
- ☐ Extra fin straps
- ☐ Extra mask strap
- ☐ Extra tank O-rings
- ☐ Extra light batteries
- ☐ Extra light bulb
- ☐ Wetsuit cement
- ☐ Plastic bags
- ☐ Diver ident card
- ☐ Zipper wax
- ☐ Seasickness preventive
- ☐ Wrench
- ☐ Pliers
- ☐ Screwdriver
- ☐ _____
- ☐ _____

CARRY-ON

- ☐ Tank & backpack
- ☐ Weightbelt
- ☐ Weights
- ☐ Tube float
- ☐ Divers flag
- ☐ Camera(s)
- ☐ Strobe(s)
- ☐ Extra film
- ☐ Extra batteries
- ☐ Camera line
- ☐ Spearfishing gear
- ☐ Metal detecting gear
- ☐ Wreck diving tools

ADDITIONAL GEAR

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____



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reading light eliminate fumbling around in the dark. There's also a lamp that lasts up to 70 hours. Plus our auto-focus feature that helps make the slide you're projecting look crisp and sharp. And, amazing but true, the projector even turns the lights off. The Kodak Carousel 5600 projector. It's a gift anyone would love.

From Kodak
The Pro in Projectors



TRIANGLE DIVE CENTER

Captain Bruce Chambers' Triangle Dive Center, in association with Howard Johnson's Motor Lodges, has just expanded its four day, three night dive packages to include Islamorada and Marathon in the Florida Keys. Triangle Dive Center's main office, on the water at Howard Johnson's, Key Largo, now offers the free use of an underwater camera aboard its six passenger, 31 foot custom dive boats. A PADI trained scuba instructor is also available to teach you to dive in as little as one day, or to dive with you as a guide.

For more information write: Capt. Chambers, 102052 Overseas Highway, Key Largo, Florida 33037. ✉

COLLEGE DIVE STORE

PADI International College has opened a complete dive store for training purposes only. The model store is designed to train instructors for entry into the retail store environment.

The store is complete with counters, display cases, racks, mannequins, cash registers, telephones, lights, and all the ancillary items needed for any good store arrangement, such as: potted plants, pictures, travel promotions kits—even a burglar alarm system.

Major equipment manufacturers con-

tributed products to make the model store as well stocked as any in the retail dive equipment business.

The model store is used throughout the retail dive store sales and operations course to provide a very realistic selling environment for sales role playing. Here the student learns to greet the customer, create rapport, qualify his customer, and make and close the sale. He learns to sell continuing education, travel, and promote special programs that will help to keep customers diving. The store is also used in the Gold Instructor course.

All store owners/managers and their personnel, and all professional instructors, regardless of affiliation, are invited to visit PADI International College's model dive store. ✉

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Deceptively small, these dependable companions are rechargeable and rated to 2,000 feet, making them the world's lightest, toughest and brightest dive lights that can be hidden in your B.C. pocket.

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The '83 Dodge Charger 2.2 0 to 50, it blew past Trans-Am and Camaro Z28.

Performance Driving Machine Performance Report.

- ✓ 0 to 50 in 5.8 seconds*
- ✓ Only front-wheel-drive sports car certified by USAC.
- ✓ 46 est. hwy. [28] EPA est. mpg.**
Highest mileage sports car certified by USAC.
- ✓ \$7,438†† equipped.
- ✓ 5 year or 50,000 mile protection plan.†††

Last year Dodge Charger 2.2 turned heads when it blew the doors off Trans-Am and Camaro Z28.

This year Charger 2.2 made

heads spin when it blasted past Datsun 280ZX*.

Talk about awesome. That was the '83 Charger 2.2's performance from 0 to 50 in just 5.8 seconds.

Front-wheel-drive made it possible.

Much of the credit for Charger's performance belongs to its advanced front-wheel-drive. With more weight up front, Charger gets off and running quicker than the rear-wheel-drives; pulled by a feisty, but miserly, four-cylinder 2.2 liter overhead cam engine, compared to the big sixes and eights that push Trans-Ams, Camaro Z28s and

280ZXs around. Harnessing Charger 2.2's powerplant is a new five-speed transmission with a top overall gearing of 2.57 which contributes to mileage figures like 46 est. hwy. and [28] EPA est. mpg.**

Driving a 2.2 can really save you a bundle on gas every year.



America's highest mileage, 5-passenger sports coupe, Dodge Charger. 50 est. hwy. [32] EPA est. mpg.** \$6,379††

*Based on acceleration tests performed by NHRA. Comparison only applies to cars with standard engines and transmissions. Competitive cars 1982 models.

**Use EPA est. mpg to compare. Actual mileage may vary depending on speed, trip length, weather. Actual hwy. mpg. probably lower. CA ests lower on Charger 2.2.



Now it's beaten Datsun 280ZX. That's awesome.

Just check the chart below to see how much you can save.

MODEL	EPA MPG**	HWY. MPG.	Avg. annual fuel cost***	Est. 3 yrs. savings.
Charger 2.2	28	46	\$ 884	—
Camaro Z28	16	27	\$1,547	\$1,989
Pontiac Trans Am	16	27	\$1,547	\$1,989
Datsun 280ZX	21	31	\$1,178	\$ 882

Not only is Charger 2.2 the only front-wheel-drive sports car, but it's also the highest mileage sports car certified by USAC.

Charger 2.2 gives you the kind of precise, predictable handling you expect from front-wheel-drive and rack and pinion steering. While the sports suspension with

MacPherson struts, and linkless sway bar, plus performance steel-belted radial tires keep Charger seated firmly on the road. On the other hand, if you're into off-road racing, there's a Direct Connection dealer who can help you tool up for more†

5 year or 50,000 mile protection.†††

Like every Dodge we make, your '83 Charger comes protected for 5 years or 50,000 miles, whichever comes first, on the engine and

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If Charger 2.2 is your kind of car, you can buy or lease one at a Dodge dealer.

Not much can beat her on the road. And at \$7,438†† you'll have a harder time beating the price. Remember, buckle up for safety.



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*** Average annual fuel cost as calculated by the EPA. † Use of Direct Connection parts may void limited warranty. †† Sticker Prices excluding taxes, destination charges. White sidewall tires: \$59 extra on Charger. ††† Limited warranties. Deductible may be required. See your dealer for details.

Rx FOR DIVERS

BY FRED BOVE, M.D., Ph.D.

Our knowledge of dive medicine has advanced considerably in recent years. This month's Rx for Divers is a review and update on the topic of decompression sickness.

Decompression sickness is owing to formation of gas bubbles in the blood and tissues of the body when there is a sudden drop in environmental pressure. Although we usually think of the problem in divers, aviators also can get decompression sickness by going to high altitudes

rapidly. It was recently discovered that divers can even get decompression sickness without changing pressure, by switching their breathing gas mixture from air or nitrogen/oxygen to helium/oxygen. Avoiding this kind of decompression sickness is important in commercial diving where various gas mixtures are used. When pressure falls too rapidly, gases dissolved in tissues become supersaturated and form bubbles. Some of the bubbles make their way to the blood stream and travel through the veins to the lungs where they are trapped. Others expand in tissue and cause local injury and pain. The joint pain known as bends is probably from bubbles in ligaments, tendons or joint spaces, although the exact location of these bubbles and how they produce pain are not known.

Bubbles can form in the veins around the spinal cord and in the spinal cord tissue itself. When this occurs, there is injury to the spinal cord, and the diver will have weakness, paralysis, numbness or tingling, usually in the legs. When these symptoms appear, we call the problem serious or type two decompression sickness, while the type which causes joint pain (limb bends) is called type one decompression sickness. We think, however, that this division of decompression sickness into two categories may be artificial, when in fact, the two types just represent more or less severe forms of the same disease. Other minor symptoms in-

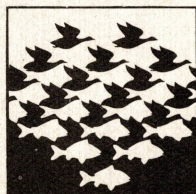
clude skin rash and fatigue, and other major symptoms include chokes from circulatory blockage in the lung, injury to the inner ear or balance mechanism, and shock from severe decompression sickness—which occurs following rapid ascent from deep depths (called blowup).

Another form of decompression injury occurs in bones. Certain diving exposures and exposure to work in high pressure atmospheres has resulted in damage to bones many years after the exposure. These diving exposures include mixed gas saturation diving, deep air diving with inadequate decompression and pressurized tunnel or caisson work. Commercial divers who have a history of limb bends also are prone to develop bone damage years after diving is over. *There is no evidence, however, that sport scuba divers get bone damage from diving.* Sport diving exposures apparently are within safe limits for preventing any long-term bone problems.

The various problems which can arise with decompression sickness should provide some incentive for good dive planning and conservative use of decompression tables.

An important new area in decompression sickness has been added to our knowledge in recent years. We have found that decompression sickness is more than just a problem with bubbles blocking circulation and damaging

(Continued on Page 102)



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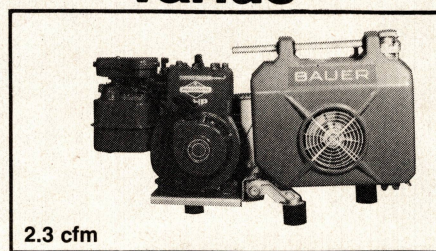
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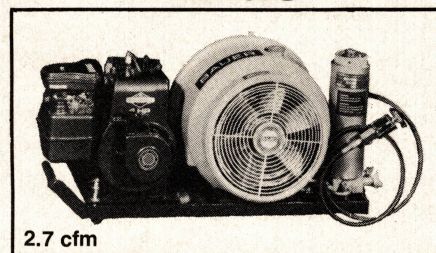
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Not all of our graduates pursue careers as working divers. Many rewarding positions are available in topside support operations, and the technical background you receive at F.I.T. enables you to select alternate avenues of employment.

In addition to diver training, you receive instruction in equipment maintenance, welding, basic machine shop practices, compressor maintenance, diesel maintenance, rigging and seamanship, hydraulic systems, fabrication of high and low pressure air and gas systems, underwater emergency medical procedures, and recompression chamber operation. Courses in communication skills, math, science, basic mechanics, electricity, physics, chemistry, oceanography, underwater photography, and marine biology are included to round out your degree program. Take part in our scuba instructor training program, too! At F.I.T. you also have the opportunity to work on other degrees simultaneously.

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F.I.T. admits students of any race, color, sex, national or ethnic origin and does not discriminate on the basis of handicap in admissions or access to its programs.

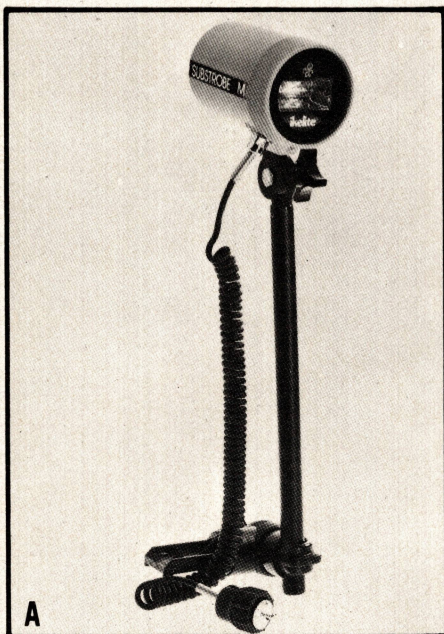


UNDERWATER TECHNOLOGY



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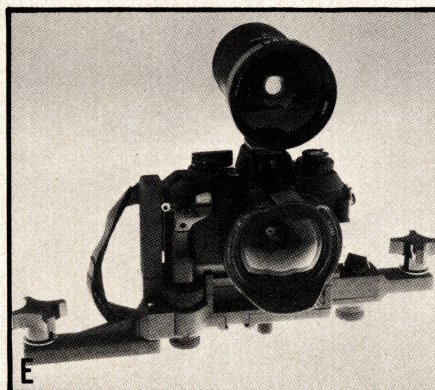
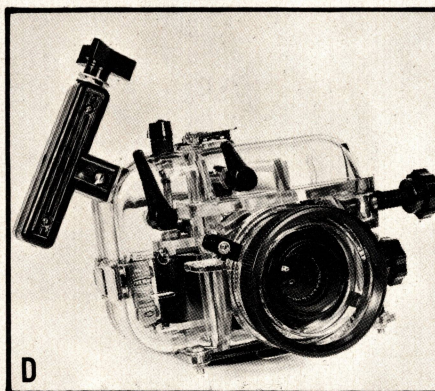
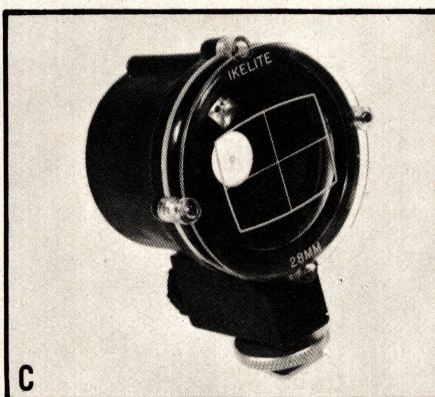


A — SUBSTROBE M & MA

Incredible value and capability in a small convenient size. Excellent coverage for a 28mm lens and superb for macro work. An honest 6 second recycle time, up to 300 flashes with four "AA" batteries, a true underwater guide number of 45 (ASA 25) and a realistic price. The Substrobe MA adds slave and/or fully automatic exposure control to these impressive capabilities. Shown with the versatile and inexpensive Strobe Mount I which allows almost unlimited positioning of the strobe.

B — MINI C-LITE

Brightest of all the small flash-lights and virtually indestructible. A rotating on/off switch allows easy one hand control. The intensity and compact size is delightful. An optional #1056 holster is available for mounting on strobes or any belt up to 2" wide. Mini C-Lite I produces 4-6 hours of light with four "C" cell alkaline batteries (not included). The Mini C-Lite II, includes a charger and ni-cad batteries producing about two hours of constant intensity between charges.



C — OPTICAL VIEWFINDER

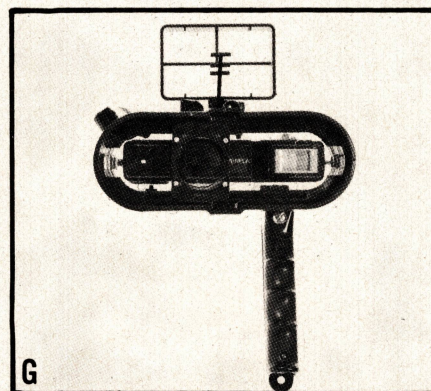
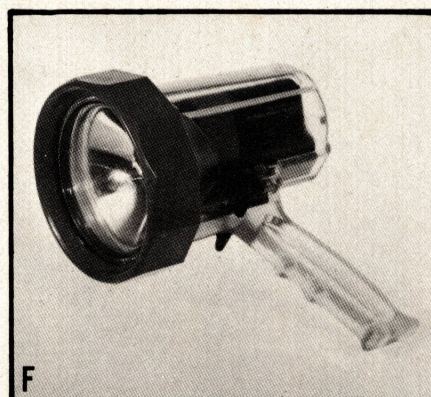
This simple, but accurate viewfinder offers fine optics, parallax correction, and masks for 50mm to ultra-wide lenses. The 20mm mask is ideal for use with the Nikonos 15mm lens.

D — IKELITE SLR CASE

The 35mm Single Lens Reflex camera is the most versatile system in the world both above and below water. Combined with the Ikelite SLR Case, they both offer through-the-lens viewing and focusing, no parallax problems, built-in meters, multi-shutter speed selection and interchangeable lenses at realistic costs.

E — ICS/NIKONOS IV CONNECTOR & HANDLE

The ICS/Connector Console is a combination connector and tray; includes a battery compartment, 3 strobe bulkheads, and accessory mounting points. The Handle provides a second strobe mounting point plus an adjustable sure grip strap for camera comfort and easy access to shutter and film advance controls.



F — IKELITE II

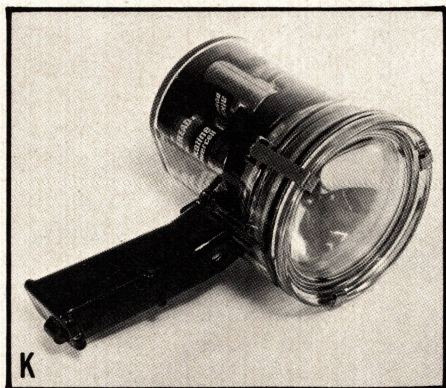
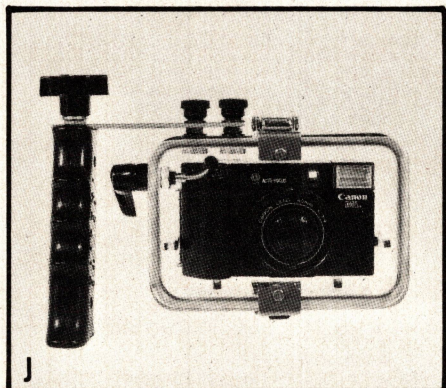
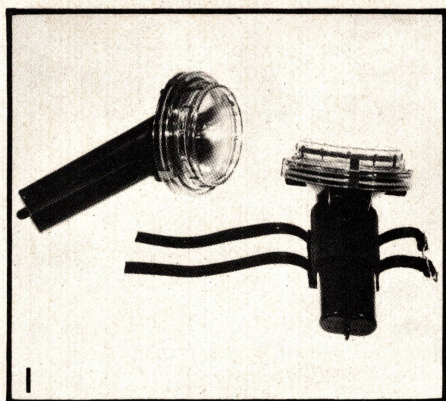
The total concept of this light is simplicity in design and trouble free performance. The Ikelite II features a unique on/off switch, switch lock, floats bulb up, and is guaranteed unbreakable. Available in a super bright rechargeable model.

G — TRIMCASE

Underwater photography has never been so simple and inexpensive. The Trimcase, Close-up Lens, and Sportsfinder allow the 110 photographer to get excellent underwater photographs. Cameras with built-in flash and motor winders are extremely simple and easy to use.

H — SUBSTROBE MS & STROBE HANDLE

Substrobe MS is a slave unit (no cord) with the features of the Substrobe M. The Strobe Handle is ideal for macro photography and can be carried on a lanyard or mounted to the Strobe Mount I or II.



I — C-LITE II

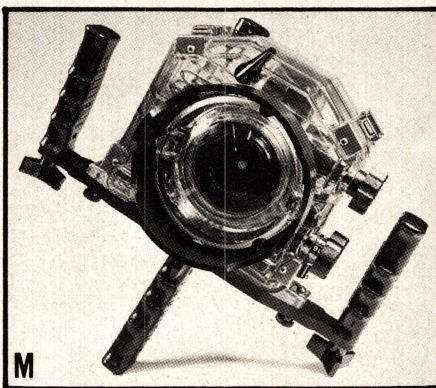
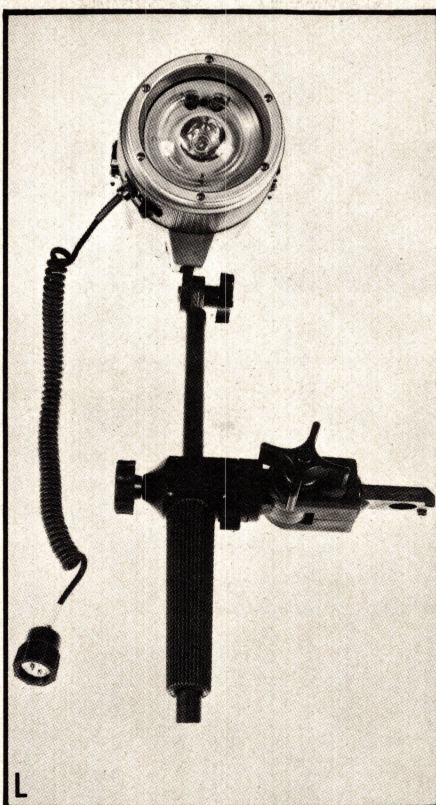
One of the brightest rechargeable lights in the diving industry. The special ni-cad batteries provide a constant intensity for about 1½ hrs. between charges. The compact size and unique shape is comfortable to hold or fits optional #1055 C-Lite Holster.

J — RANGEFINDER HOUSINGS

Rangefinder cameras can produce excellent underwater photographs almost automatically. Several camera models such as the Canon AF35ML include auto film load, auto focus, auto exposure, auto winder, built-in flash, and a quality lens.

K — MODULAR X LITE

The modular X Lite utilizes a powerful bulb and six "D" cell alkaline batteries to produce an intensity equal to most of the rechargeable lights. This inexpensive light offers all the unique features of the modular light series and can be converted to a Modular Superlite or Movielite.

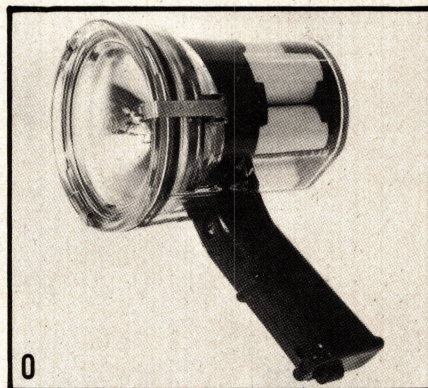


L — SUBSTROBE 150L & 150A

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M — IKELITE SLR-MD CASE

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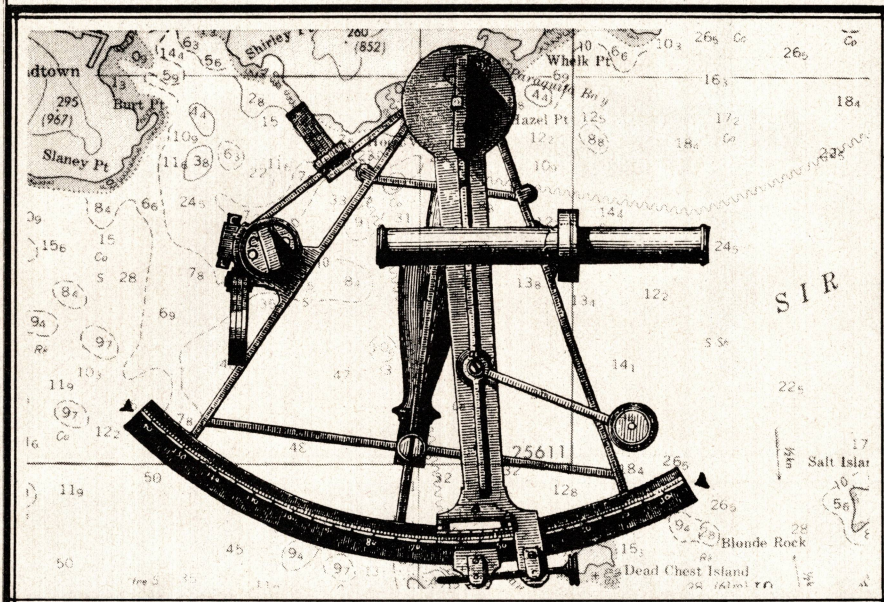
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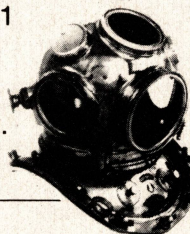
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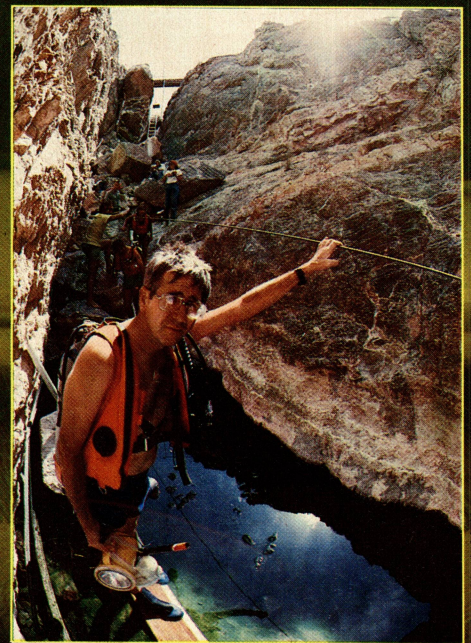
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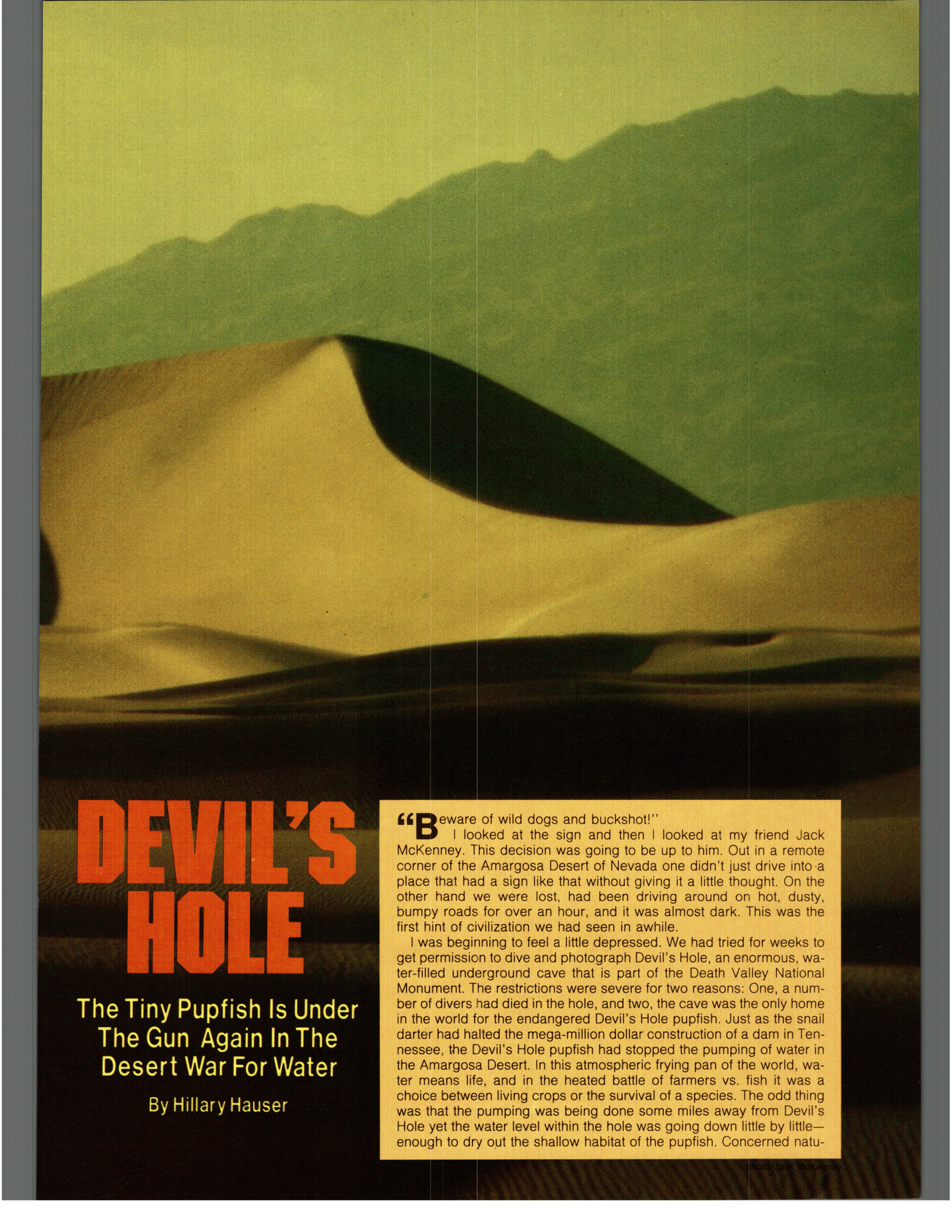
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Background: Parched Amargosa Desert. **Above:** Dr. James Deacon ready to dive in Devil's Hole. **Below:** these pupfish are found nowhere else in the world. **Left:** the area has other springs.



Photo: Jack McElroy



DEVIL'S HOLE

The Tiny Pupfish Is Under
The Gun Again In The
Desert War For Water

By Hillary Hauser

"Beware of wild dogs and buckshot!"

I looked at the sign and then I looked at my friend Jack McKenney. This decision was going to be up to him. Out in a remote corner of the Amargosa Desert of Nevada one didn't just drive into a place that had a sign like that without giving it a little thought. On the other hand we were lost, had been driving around on hot, dusty, bumpy roads for over an hour, and it was almost dark. This was the first hint of civilization we had seen in awhile.

I was beginning to feel a little depressed. We had tried for weeks to get permission to dive and photograph Devil's Hole, an enormous, water-filled underground cave that is part of the Death Valley National Monument. The restrictions were severe for two reasons: One, a number of divers had died in the hole, and two, the cave was the only home in the world for the endangered Devil's Hole pupfish. Just as the snail darter had halted the mega-million dollar construction of a dam in Tennessee, the Devil's Hole pupfish had stopped the pumping of water in the Amargosa Desert. In this atmospheric frying pan of the world, water means life, and in the heated battle of farmers vs. fish it was a choice between living crops or the survival of a species. The odd thing was that the pumping was being done some miles away from Devil's Hole yet the water level within the hole was going down little by little—enough to dry out the shallow habitat of the pupfish. Concerned natu-

photo: Jack McKenney



photo/Jack McKenney



Below: entrance to Devil's Hole.
Top: Dr. Deacon and author.
Above: visibility in the
spring was 300 feet.

ralists knew that if farmers kept it up, the Devil's Hole pupfish would become extinct. They took the issue to court. By 1976 the issue had progressed to the Supreme Court and, in a landmark decision which for the first time made the legal connection between surface and ground water, the fish won. The protection of the fish is now a matter taken very seriously by the National Park Service, guardians of the pupfish. No one is allowed in Devil's Hole, period.

What was this mysterious water system of the desert? Underneath the hot and arid sands of Death Valley, California and the Amargosa Desert just across the border, was a volume of water rumored to equal that of the Great Lakes. Water was pushing up in springs, ponds and sink-holes and then there was this "bottomless" cavern called Devil's Hole.

Every month a scientist made a dive in Devil's Hole to count the pupfish. This scientist, Dr. James Deacon, had been a star witness in the Supreme Court trial, and when I told Deacon that I wanted to investigate the pupfish situation, the sink-holes and springs of the desert, I also told him that I wanted to see Devil's Hole. This last request was slightly reckless. No one ever got into Devil's Hole. Deacon thought about what I wanted to do, and then he said that, well, he needed a safety diver to accompany him.

I jumped at this suggestion. Immediately I called the National Park Service in Death Valley, and not so immediately I got their permission to make a dive as Deacon's safety diver. I was told that I could make one dive. Just one. I was lucky to get just one. After that, no one would get in, and even Deacon's monthly dives were being cut to two per year.

Jack and I arrived in Death Valley during one of its big heat spells and Death Valley is, in summer, the hottest place in the world. Hotter, even, than the Sahara Desert. So far, all we had managed to do was become very lost. We hadn't found any of the springs, or even Devil's Hole for that matter. If we were going to meet Jim Deacon early the next morning at Devil's Hole, we needed to find the place before dark, which was coming fast.

Jack McKenney is an old friend I'd worked with for years on various magazine projects. He does everything with a high degree of professionalism. I'd talked him into this wild goose chase in the desert, and I wondered what he was thinking as we now looked at the wild dogs and buckshot salutation.

"What the hell," said Jack. "Let's give it a try."

I was relieved to hear it. Jack's sense of adventure was far from dead. We drove past the sign into a fenced area toward a tin shack set in the middle of a large collection of rusted bedsprings, old appliances, benches, kitchen sinks, ma-



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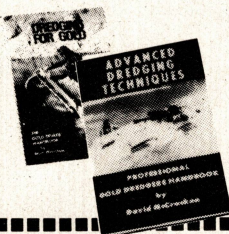
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DEVIL'S HOLE PUPFISH

chinery, and other odds and ends. The only thing missing from this permanent swap meet was a rusted-out car.

Immediately two big dogs came running at the car, barking and snarling, one at each door. "Nice doggy," said Jack. On top of his sense of adventure Jack was displaying an enormous amount of optimism, and I really liked him right then.

A man emerged from the tin house—without a gun. He was youthful in his baseball cap and didn't seem belligerent. He called off the dogs.

"We're lost," Jack called out. "Could you tell us where Devil's Hole is?"

"Shore!" said the man. "Why don't you come in and sit a bit?"

This wasn't buckshot by any means. We proceeded to get out of our car, only to find that the wild dogs jumped up on us like big puppies.

We told him what we were doing.

"Follow me," he said.

He led us over to an area of his yard which was fenced in by the circular ends of enormous wood spools, near an arbor of grape vines. He pointed off in the distance. "See that mountain over there? The very last one of the bunch?"

We said that we did.

"See that dark spot . . . near the base of it?"

We made out the dark spot.

"That's Devil's Hole."

At 8:00 am the next morning Jack and I arrived at Devil's Hole. It looked like a prison camp sunk into one side of a volcanic mountain. Giant coils of barbed wire tangled with the metal mesh of a high, impenetrable fence to seal off the confining pit from the outside world, and at one end was a heavy gate, sealed shut with a massive chain and padlock. Just inside the gate was a steep rock cliff, bridged by a wooden ladder propped against its uppermost ledge. A rock slope descended the rest of the way to the bottom of the cavern, where a rectangular trough of water emerged from underneath the mountain. That trough was "bottomless," a flooded earthquake fault.

At 8:30 Jim Deacon arrived. So did Pete Sanchez from the National Park Service, Bob Yoder from the U.S. Fish and Wildlife Service, and there was also a representative from the Bureau of Land Management. It was all serious business.

Jim Deacon prepared for the morning dive. He laid down a narrow bridge of boards over the shallow shelf of bright green algae where the pupfish lived and then we geared up. There would be three of us on the dive—Jim, myself and a Park Service safety diver named Bob Todd. As I tight-roped across the narrow boards in my heavy dive gear I looked down at the tiny fishes, each one of them no bigger

than a minnow. They swam leisurely around their shelf, picking at algae, oblivious to the human *sturm und drang* above them. They didn't know about the badges or the barbed wire, and most likely they were even oblivious to the fact that there were so few of their numbers left in the world. They were tiny little fishes under enormous lock and key.

I carefully put one foot on the very edge of the shelf and lowered myself backward into the drop-off of clear, blue water. As I waited for the others, I looked down and could see the first ledge below me at about 30 feet. The water was a warm 92°F, which was like swimming in nothing, and it was so clear that visibility might have been 300 feet. It was like soaring in air, the closest thing to flying I'd ever known.

As the three of us sank down through that giant, water-filled crack in the earth, I almost forgot about the others. The sides of the main shaft were of white limestone—limestone that had been laid down 550 million years ago and which had been chiseled over the years by water into smooth slopes on either side. Rusty colored organic material on top of elevated ridges of stone created an ethereal effect.

At 60 feet I turned and looked up toward the surface. The bright blue of shallow water illuminated down through the main shaft and silhouetted the configurations of the sloping wall on the right side. From where I was I could see people standing around on the rocks above, almost as clearly as if there were no water between them and me. Just as distinct was the long, rectangular lamp which hung over the water, a lamp which was positioned over the pupfish shelf and turned on when algae production needed a boost. Another shaft of light beamed down from the back of the main entrance at the surface, behind a rock. The slope of limestone leading to it created a narrow ledge against the ceiling of the cave.

I turned again toward the bottom and the three of us turned on our lights. We sank to 90 feet where an enormous flat stone, appropriately named Anvil Rock, signaled the deepest part of our dive. This stone, obviously shaken loose from above, marked the deepest spot where the pupfish wander from their shallow shelf. Jim started counting at this point.

Later, over a lunch of pizza and beer at a mid-desert saloon near the California/Nevada border, Jim told us that the pupfish had been stranded in Devil's Hole 20,000 years before when the fresh water system of the desert began to dry up and recede. Because Devil's Hole was one of the habitats higher up, they were the first to be stranded, the first of the desert pupfishes to begin evolution into its own, distinct species.

All pupfish species have tolerated periodic difficult living conditions, usually associated with summer heat. When the sun is hot their habitats dry up, and some

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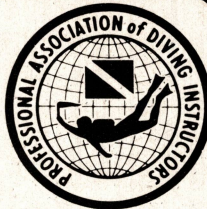
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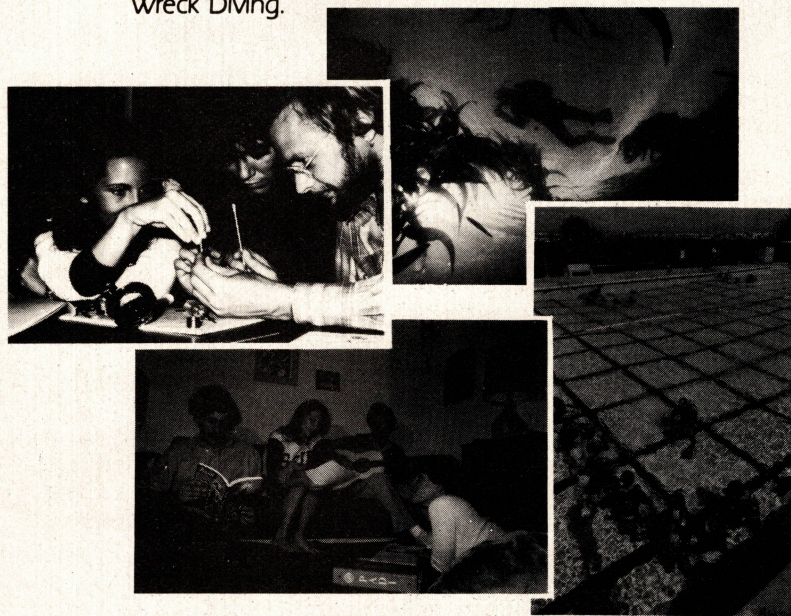
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DEVIL'S HOLE PUPFISH

pupfish survive parched summers in homes the size of a teacup. Salinity levels increase, and the desert pupfish is the only fish in the world that can tolerate such concentrations of salt. The fish also withstand the freezing temperatures of winter and a host of other difficulties which include aggressive non-native species of fish and crayfish which fight the pupfish for food and territory.

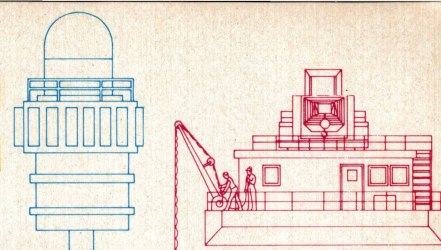
The irony is that the adaptable little fish may not be able to withstand what human beings do to it, and that is why there is yet another battle brewing in Ash Meadows over water rights. The pupfish is presently threatened by a land development scheme which would turn 13,000 acres of Ash Meadows into a recreational/housing development with perhaps a few golf courses thrown in. Again, a war for water. Again, the Devil's Hole pupfish is under the gun.

U.S. Senator Alan Cranston has introduced, for the sixth time, a bill which would create a national wildlife refuge in and around Ash Meadows. This move would not only protect the Devil's Hole pupfish, but a number of other endangered plants and animals as well, animals that exist nowhere else in the world. The bill has needed public support to get to hearing, and at the point we were sitting around the mid-desert saloon things did not look all that cheery. The 250 surviving pupfish of Devil's Hole could lose their final war for water.

It was Rex Schneehagen's 82 year old father who summed up the whole subject for us. Frank Schneehagen was alone at the tin house with the wild dogs when we went back for a visit because Rex was off attending to his firefighting duties in Las Vegas. Frank has owned that particular piece of land since the 1940's, loved it and understood it well. He laughed at our gallons of Gatorade, sodas and bottled water. He led us over to a spring which bubbled up slowly in a corner of his property at the rate of 12 gallons per minute, then spoke of his spring with affection. It had fed his trees and the trees had lowered the desert heat around his house by a good 20°F. The water fed his grapevines, his vegetables, his horses, his peacocks and him. He took two tin cans that hung upside down on sticks and dipped them into the spring. He gave one can to me, took one for himself, and toasted. His salutation was the last word in what water means to the desert, what it means to a group of unique animals that are struggling for survival in Ash Meadows, what it means to the pupfish of Devil's Hole.

"Drink this," said Frank Schneehagen, holding up his tin can of water. "You do, and you'll never die." 

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C.D.C. is an integral part of one of the world's largest diving contractors... Oceaneering International, Inc., which is C.D.C.'s parent company and which has three out of five of the major deep water contracts, and the majority of the largest underwater exploration, construction, and maintenance projects. O.I. is heavily involved in over one-third of the world's drilling rigs.

The fact is:

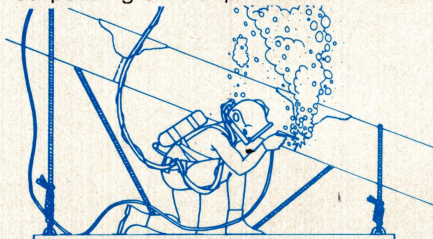
Oceaneering International designed Commercial Diving Center's training programs, moving over 40% of the graduates into key jobs under world-wide diving contracts. The others may opt to work for some 200 diving contractors who look upon C.D.C. as a producer of high-quality trainees ready to take on any job with any type of equipment.

The reason is:

C.D.C. graduates are sought after as skilled specialists with a hands-on knowledge of the most up-to-date procedures and equipment. C.D.C. training programs are designed and constantly updated by O.I. At C.D.C. students will train on equipment they will actually use on the job in the off-shore oil diving operations.

Being best means being first:

O.I. and C.D.C. have continually pioneered the commercial diving industry. In solving specialized problems, our creative staff developed; the first underwater diving bells, the first underwater hot tap, the first underwater commercial submarine lockout dives, the first 600-foot, non-saturation dives, and the first 1,000-foot diving service, plus dozens of firsts in lesser known related processes. Most recently, two C.D.C. graduates employed by O.I. successfully performed the world's record dive to a depth of 2,250 feet, surpassing O.I.'s depth record of 1980.



OUR DIVERS ARE IN EVERY MAJOR OIL AREA IN THE WORLD



A revolution in technology:

Constant improvement in techniques and equipment increase a diver's ability to work at greater depths safely, efficiently and effectively. To accomplish this objective, our Research and Development staff has developed deep water systems which have revolutionized the diving industry. Among these are:

ARMS—Atmospheric Roving Manipulator System

JIM—A one-atmosphere armored diving suit for deep water work

WASP—For mid-water tasks

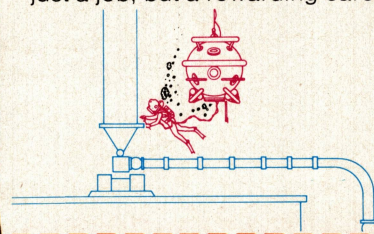
ORCA—A manned submersible

Maintaining our reputation:

To stay on top of the subsea contract market, O.I. must have the best training program available at C.D.C. O.I. is able to respond faster, complete jobs quicker and at less cost than other diving contractors because its divers, welders and technicians have superior training. To be the best, you have to train the best. And the only way to stay the best is to constantly get better.

Your role:

Your scuba certification is just the beginning of a top career in the rewarding field of commercial diving. With Oceaneering and Commercial Diving Center, you can achieve the best of that world. Send for our big, comprehensive literature package. Compare us with others, what it will cost against what you will get. We're eager for you to make this comparison. In evaluating the differences, you'll quickly see that C.D.C. offers you not just a job, but a rewarding career.



Member: Association of Commercial Diving Educators

Commercial Diving Center

Los Angeles Harbor

272 S. Fries Avenue, Wilmington, CA 90744
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C.D.C. is the only Diver Training Division of OCEANEERING INTERNATIONAL, INC., with companies in over 17 foreign countries.

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SD-1282



An underwater expert talks about Magnum.

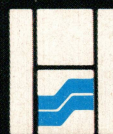
"Sure, gills are great in clear, warm water, but the Sherwood Magnum series lets you dive anywhere. Even in silted, sandy or cold water, the simple Magnum design assures you of a dependable, easy-drawing supply of air.

"Positive air pressure seals the first stage, preventing clogging, wear, and the entrance of corrosive salt water. There's no hassling with messy silicone, plus there's no grease or oil to leak into second stage air lines. The new 'floating orifice' balancing system provides steady pressure between the stages.

"On the second stage, a rugged plastic spin-off bezel with safety lock gives quick, easy access and has no small screws to lose. The patented Sherwood variable

fulcrum and integral aerodynamic assist give you a significant performance edge over conventional gear. Plus, for cold water diving, there's the Magnum Blizzard which uses heat from your breath to minimize freeze-ups without any need for batteries or other complex hardware.

"If you need versatile, dependable diving capability, see your professional dive store today and check out the tough, lightweight Sherwood Magnum series. One good look and you'll be hooked. I guarantee it."



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Five years ago Heuer (pronounced Hoy-er) introduced its first dive watch. Now the company offers nine models in sizes to fit men, women and children. They are very handsome watches too, available in black anodized steel or brushed stainless steel and with either steel bands or rubber straps. One model is gold plated, and a couple are accented with gold. You can get quartz powered or self-winding Heuers, Twin Time Heuers with both analog and liquid crystal displays and even Heuer chronographs. And, now, you can get a quartz powered Heuer with a phosphorescent dial face. Specifically designed for night divers, it also has tritium markings on the hands and the numbers 12, 6 and 9—and these are always readable in dim light. (And, since they do not emit any harmful radiation, are totally safe.) The dial face will glow for an average of ten minutes after it has been exposed to strong light.

The Heuer phosphorescent comes in three versions. There is a small one for women and two men's versions: one in black anodized stainless steel; the other in brushed stainless steel with a rubber strap. All three have the same basic features: a scratch resistant mineral glass crystal; a one-way ratcheted bezel; a screw-down crown protected by built-up shoulders; and a limited one year warranty valid at Heuer dealers worldwide.

The watches display the day of the month at the three o'clock position on the dial face. They are pressure tested to 200 meters (about 660 feet). The battery life of the men's versions is three years; that of the woman's, two years. When the battery needs replacement send it directly to the Heuer service center (the address is on the warranty card). For less than \$20 the company will replace the battery, re-waterproof the watch and return it to you with a new, one year warranty.

All Heuer watches with metal bands also have a special clip which folds down over the catch and snaps securely in place. These clips keep the catches from opening accidentally.

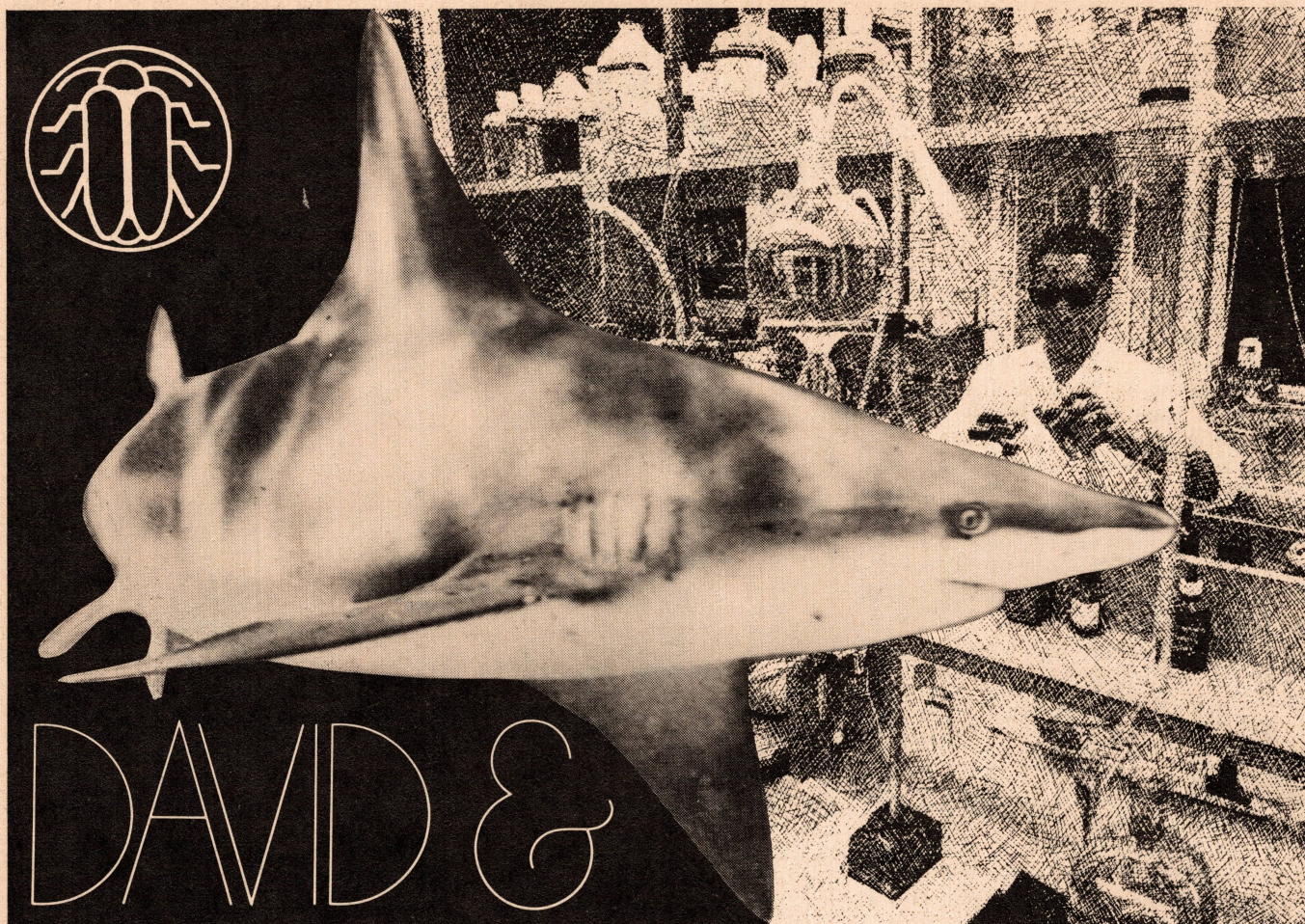
The phosphorescent dial Heuer sells for \$345 in black (man's or woman's); the brushed stainless model with a rubber strap is \$225. For more information contact: Heuer Time and Electronics Corp., 960 S. Springfield Ave., P.O. Box 420, Springfield, New Jersey 07081.



The phosphorescent dial Heuer comes in black anodized or brushed stainless steel. It has a double locking snap to prevent accidental clasp opening.

HEUER'S PHOSPHORESCENT DIAL WATCH

BY BONNIE J. CARDONE



DAVID & GOLIATH

A New And Exciting Shark Deterrent Is Being Developed From Firefly Extract **BY ELLSWORTH BOYD**

I can see it now—a familiar scene. Mom is giving her son the usual pre-dive check before he leaves the house. (He's 38 years old, but that doesn't deter her!)

"Son, do you have your vest?"

"Yes, Mom I have my BC."

"Son, do you have your knife?"

"Yes, Mom."

"Son, do you have a depth gauge?"

"Yes, Mom."

"Son, do you have your fireflies?"

"My what?!"

By now he's ready to send Mom to a nursing home. She has finally gone off the deep end...she's senile, right? Wrong! Nothing is "bugging" Mom, she

is just a step ahead of everybody. She's aware of the latest experiments in shark repellent: freeze-dried firefly extract!

A husband and wife research team—Drs. Joseph and Celia Bonaventura—and their colleagues at the Duke University Biomedical Center, Beaufort, North Carolina, are studying behavioral responses in sharks by utilizing the extract from fireflies. So far, the results are interesting and encouraging and the Bonaventuras hope to continue their studies as funds become available.

"The manager at the Office of Naval Research," Joseph Bonaventura explains, "knew about our work with flat-

fish—whose milky secretion is a natural repellent that offers protection against shark predation—and he suggested we experiment with firefly extract. It is common knowledge—and there are many anecdotal stories to enhance the fact—that there is an unusual lack of natural predators for fireflies.

In tanks, identical to those used in the flatfish experiments, Dr. Bonaventura, his wife and other scientists, dispersed freeze-dried fireflies and their extracts into waters containing the Atlantic sharp-nose shark, smooth dogfish, pinfish and killifish. Then the toxic and behavioral effects were noted among all test organ-

isms. The Atlantic sharpnose shark was used because of its availability in the waters off Beaufort. Caught by trawlers, it can be kept for long periods in laboratory holding tanks. The sharks are hardy and can be extensively manipulated without serious adverse effects. Their lives are not easily disrupted, except by fireflies.

In experiments involving dispersed fireflies at a concentration of four bugs per liter, rapid behavioral responses in the gills were noted. The responses from all fish were instantaneous, with the sharks displaying additional side effects. After several minutes exposure to the firefly preparations, the sharks were unable to swim and unresponsive to external stimuli. In the beginning the sharks attempted to leap out of the water and swam around the tank rapidly. They secreted a mucus substance from their gills and glandular pores. When it became apparent to the sharks that they could not escape the test tank, they calmed down and exhibited other responses. There were irregular opening and closing of the gill slits and increased mucus secretion. Finally, there was disequilibrium and death. All sharks that were transferred to different tanks—without firefly extract—eventually recovered after the calming period.

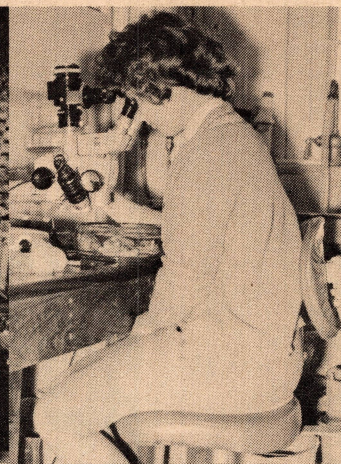
Experiments with other fish were similar to sharks in terms of behavioral responses. A semi-paralytic but non-lethal nature of the firefly preparation was observed in some short term experiments.

Naturally, a substance that leads to mortality in an hour would not, given that time scale, be considered a repellent. It is interesting to note, however, that the behavioral response to the extract was observed to be instantaneous, encouraging further experimentation with fireflies.

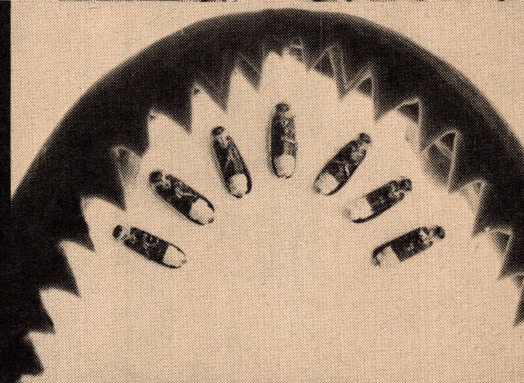
There are over 2000 laboratories in the world which are engaged in research in the marine sciences. The Marine Biomedical Center at Duke University is one of these and also one of five centers established by the National Institute of Environmental Health Sciences that focus on marine and freshwater biomedicine. Its scientists might be analyzing the biochemistry of horseshoe crabs, the effects of herbicides on invertebrates, or the accumulation of mercury in pelagic birds. The biochemical approach to shark repellent is just one of many of the center's on-going research projects, but it's one that divers find very fascinating.

Dr. Bonaventura says: "I don't want divers to think that we are claiming that we have a completely developed shark repellent. What we have is a preparation that produces an instantaneous response in Atlantic sharpnose sharks. The firefly materials do produce behavioral alterations quickly. It is a long step between something that produces a behavioral response—even though the response appears to be one of aversion—and a true shark repellent."

photo/Scott Taylor



Above: Dr. Joseph Bonaventura. Above right: A scientist works with firefly extract. Right: Fireflies and shark jaw. The Bonaventuras and their colleagues at the Duke University Biomedical Center are researching the use of firefly extract as a shark repellent.

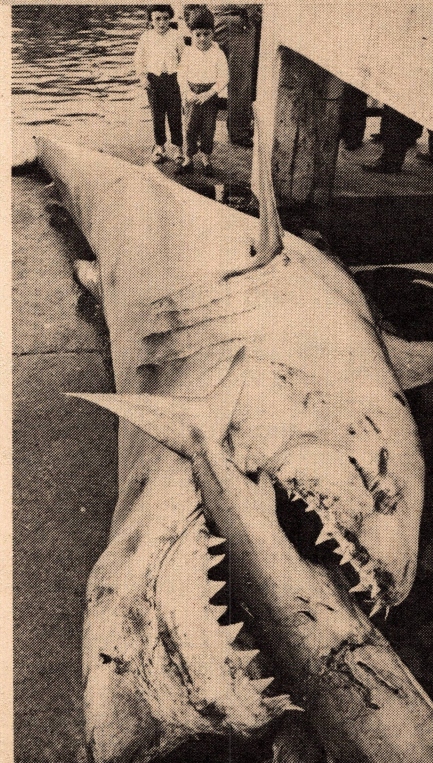


photo/Jeanette Field

Divers are concerned, too, about the second stage of a prospective shark repellent—the delivery system. "If a repellent chemical is developed," Dr. Bonaventura says, "the next stage is the delivery system. Divers can consider this question: Should repellent chemicals be continuously dispersed or only activated when the individual in the water has cause for concern?"

In the controlled release there is a continuous release of the substance into the seawater. For a diver, such a system might be activated by peeling away a watertight covering which would allow for a controlled release of the repellent into the water. The fact that low concentrations of the substance can be released in a continuous manner is its most advantageous feature. But this method requires that the repellent be active at very low concentrations. Scientists continue to work on this and other types of release systems at the Duke lab.

Dr. Bonaventura continues to work on a simple fail-safe concept that will allow humans to remain in the sea, whether by choice or by accident, in the hope of eliminating one of man's major fears: predation by sharks. Presently, in his work, the sky is the limit. Many people, especially divers, are pulling for Dr. Bonaventura to succeed. If he does, the obscure little firefly might be the David that slew Goliath, or at least chased him away for the duration of a dive. 



Large, predatory sharks such as the great white above inhabit the world's oceans. Fear of attack by sharks has been a major concern to those stranded at sea. The search for an effective shark repellent has been relatively unsuccessful in the past, but firefly extract has shown definite potential in this area.

OCEANMASTER RB 1000



TEXT AND PHOTOGRAPHY BY GEORGE COZENS

A little over two years ago, two older scuba equipment manufacturers/distributors joined forces, forming a new firm to pursue their mutual interest. The original two were Selpac of California, and the White Stag Corporation. Their merger resulted in a new name: Ocean Dynamics International. As you might expect the company's experience goes quite a way back: Robert Bludeau, president, designed the original piston regulator for the dive industry in the 1950's. Descendants of this appear in a large percentage of today's first stages.

About one year ago Ocean Dynamics introduced a new regulator: the Oceanmaster RB 1000. As ODI's product manager, Nick Icorn indicated, the intention was to produce an economical regulator that would be simple in design, give good performance, be easy to maintain, and be very reliable. Conventional, but time-proven designs were selected for both the first and second stages, and improve-

ments were made whenever possible.

The first stage is a balanced, flow-through piston design. It differs from most other similar designs in that the axis of the piston is in line with the flow of air as it enters the first stage (instead of being placed at 90 degrees). Hence, the air flow follows a straighter path, resulting in less restrictions (with a corresponding increase in capacity), and easier maintenance. An additional benefit is that with this configuration, the first stage is more economical to produce—savings which can be passed on to the consumer.

The housing of the first stage is chrome plated, heavy-duty marine brass. It provides one high pressure port, and four low pressure ports. The unmarked HP port is by itself, adjacent to the yoke, while the LP ports are at the base of the stage, in two opposing pairs. The LP ports are not on a swivel block (for reasons of simplicity, economy, and improved air flow). That should prove to be

no problem, since the swivel yoke and the compact shape of the housing should allow positioning of the first stage to minimize hose strain.

The swivel yoke is made of chrome plated, forged brass, with a rating of 4000 psi. Its yoke screw, also of chrome plated brass, has a flat, almost diamond shaped knob, which provides an easy-grip surface, while reducing the potential for entangling in kelp, fishing lines, or nets when underwater.

The high pressure seat in the first stage is made of a special thermoplastic, called Kel-F, which is harder, more durable, and more resistant to taking a set (i.e., being deformed) than nylon or Teflon. These properties result in more constant breathing characteristics between tune-ups. (Deformity of the HP seat is a major cause of regulator de-tuning, and first stage leakage.) And, when tune-ups are due, this high pressure seat merely screws out and then back in.

As an optional item, Ocean Dynamics offers an inexpensive environmental kit consisting, essentially, of a band to cover the ports leading to the ambient chamber inside the first stage, and silicone grease to displace the water in that chamber. It is a simple procedure to make the conversion with the environmental kit. It can be done at the time of purchase, or, for that matter, at any time thereafter.

The second stage gets air from the first stage at about 130 psi, and reduces it to ambient pressure via a downstream demand valve (which has dual adjustments for more precise tuning). The case is formed of a thermoplastic resin, offering a reduction in weight, while providing strength, corrosion resistance, and some thermal insulation (for the demand valve)

wear and friction in this critical area.

To decrease exhalation resistance, the exhaust tee (of neoprene rubber) has two rather large ports. This tee is securely attached with two screws, making it readily removable for service. Mouthpieces are available in an orange colored rubber or in black or clear silicone rubber. As an accessory, Ocean Dynamics offers an orange octopus second stage attached to a 30 inch hose.

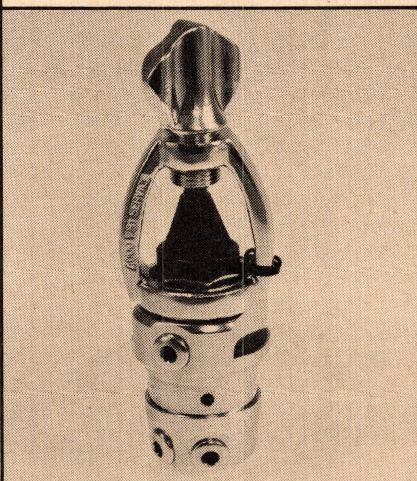
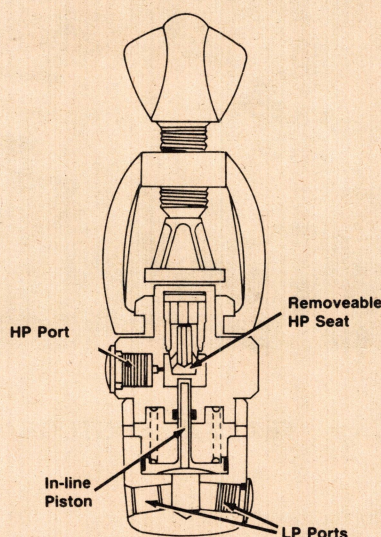
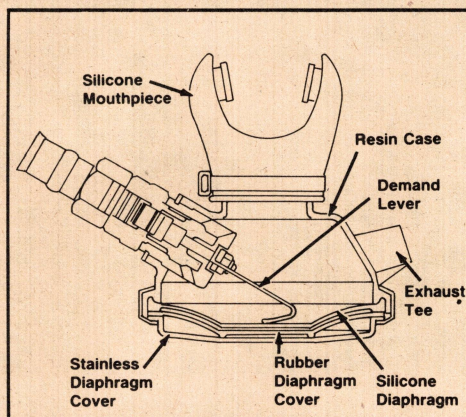
Because the design is so conventional, and the materials are all essentially corrosion resistant, no special maintenance is required. For routine care, the manufacturer suggests replacing the dust cap firmly after use, rinsing or soaking the regulator in fresh water, then shaking out any excess water, and drying (out of the

sun) with the hoses loosely coiled. Water spots can generally be removed from the metal surfaces by wiping with a soft cloth. Routine inspection should include: hose(s), for signs of blisters or cracks; couplings, for wear or leakage; and the high pressure inlet filter, for evidence of rust (from a rusty tank) or of salt water entry. Any such telltale signs of damage should prompt early repair. And, of course, never use lubricants in or on the regulator—unless you are a professional, and know what you are doing. Finally, service (including inspection, cleaning, adjustment, etc.) is recommended by a qualified service facility at least once a year—but this is the standard recommendation for all scuba regulators.

During my own evaluation of the Oceanmaster, it seemed to perform quite well. Try as I might, I noticed no idiosyncrasies: Its breathing characteristics were very predictable (but this should be expected from a conventional design). The regulator was found to very dry: I tried just about every imaginable position, and discovered only one that produced any water—that position was standing on my head, and even then, the water leakage amounted to only a trickle. The inhalation effort was relatively low: slight resistance was felt, but this was not objectionable. And, the Oceanmaster appeared capable of delivering all the air I could handle. Exhalation effort seemed to be quite low. Some bubbles exhaled in front of my mask, when looking ahead, horizontally, but disappeared when I tilted my head down 40 to 45 degrees. Freeflowing was not too unusual: the unit would freeflow enthusiastically with the mouthpiece aimed upward, when the case was full of air, or the purge depressed; but would stop when the mouthpiece was pointed horizontally or downward. For this reason, my suggestion would be to rotate the second stage with the mouthpiece down during a buddy breathing exchange, to prevent air loss and any confusion caused by the cloud of escaping bubbles. All in all, I was happy with the performance of the Oceanmaster regulator, and would recommend it to any prospective shopper.

The Oceanmaster RB 1000 comes with a limited, lifetime warranty. For a suggested retail price of about \$170 this should be a good, solid, economical regulator for most dive applications, and owing to its reliability and easy maintenance, would be especially well suited for rental and/or training.

For more information contact: Ocean Dynamics International, 363 W. Victoria St., Gardena, CA 90248. ➤



The RB 1000 has a dual diaphragm cover and tough resin case. The first stage has one HP and four LP ports.

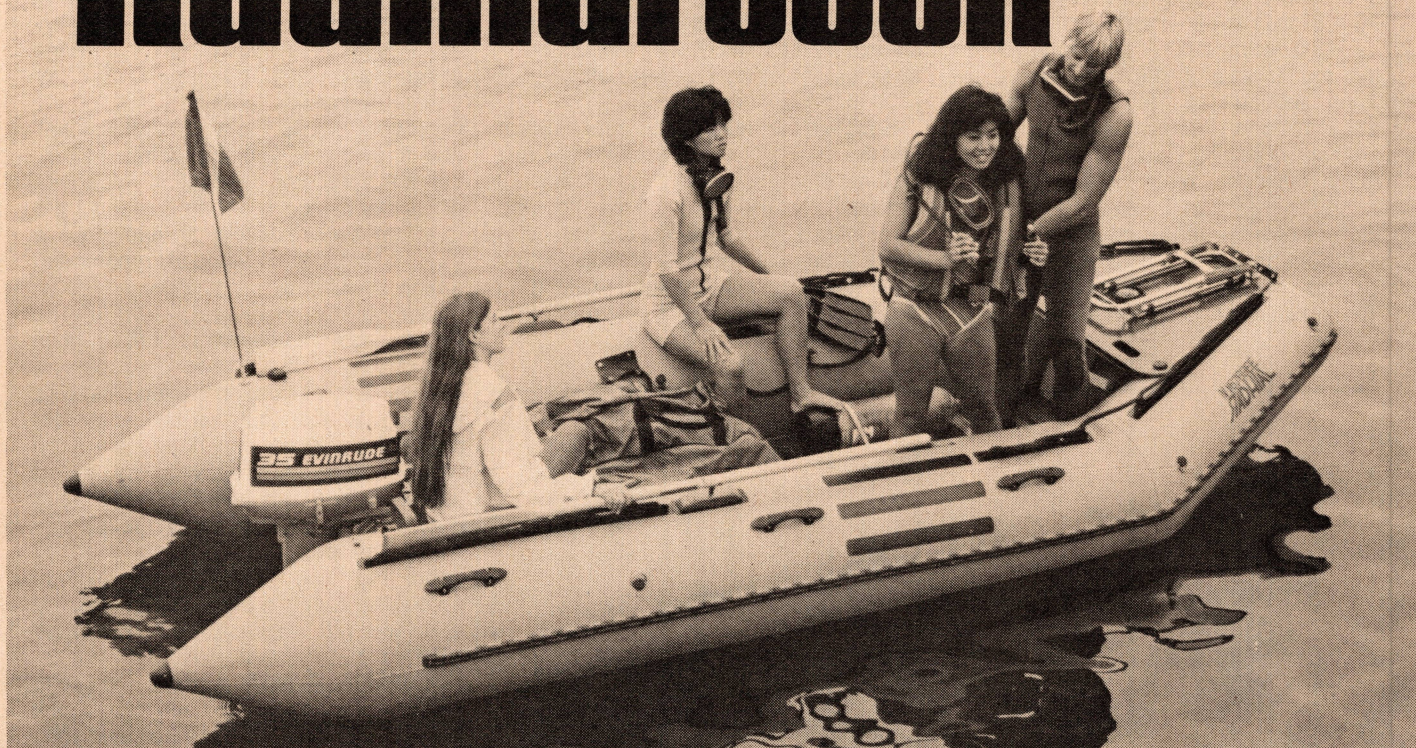
from cold water (less chance of icing).

A stainless steel diaphragm cover forms the front of the second stage housing—being reasonably lightweight, this cover is stronger and more resistant to scratches than one of chrome plated brass. Behind the stainless cover is another diaphragm cover, this one of neoprene rubber, giving additional protection to the diaphragm and serving as an unusually large purge button. Finally, inside these two covers, we get to the silicone rubber diaphragm—silicone rubber, because it has excellent resilience, and superior resistance to ozone, chlorine and other chemicals. Silicone rubber is also used in the large exhaust valve.

Linking the diaphragm to the demand valve, is the demand lever, a stainless steel arm which converts diaphragm movements to the opening and closing of the valve. The end of the lever, which contacts a disk bonded to the back of the diaphragm, has a nylon pad to reduce

THE INFLATABLES

the Radhial 955R



An Innovative Italian Import

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

The recent growth of the inflatable boat market in the United States has resulted in the introduction of many new models to our shores. Some of them are merely copies of the boats we have been seeing for years. Few of them are different and original. But the Radhial 955 R breaks the mold. This Italian boat has several innovative features which could be the wave of the future in its field.

First of all its outer skin is a plastic material called Erstrom, a mixture of vinyl/polyurethane on Trevira cloth of 1000 denier thickness. All seams are electronically welded rather than glued. That is unusual, but hardly revolutionary, because several reinforced plastic boats are on the market. But Radhial is the only one with inner tubes. This construction, like the modern buoyancy compensator, affords double protection against abrasion and punctures. For service, the owner can open the outer skin by means of a patented zipper device, made up of individual plastic toggles which are opened by hand after pressure is released from

the pontoons. The toggle zipper doubles as a rub rail and individual toggles can be replaced by the owner if broken. As a matter of fact, anything on the boat can be replaced by the owner. Not a single drop of glue is used in manufacture. Everything is either electronically welded or screwed together. An owner with minimum mechanical ability can effect any repair, from replacing a valve to patching or replacing any of the three inner tubes.

In the field, a repair patch is glued in place with a special cement. When the boat comes home, a permanent patch can be electronically welded to the inside, using a \$15 accessory tool.

Now, that's different. But the innovations don't stop there. The toggles, the inner tubes and the bolting system for attachment and replacement of components are patented features. Instead of a bowdodger, the 955 R has a front deck made of marine plywood. The wooden keel forms a deep V-hull which cuts into the waves for maximum directional stability with minimum bounce.

Although the Radhial line is new in the United States, Europeans have been familiar with it for nine years. The boats are produced by Plasteco Milano of Italy, a company which has been making pneumatic structures, industrial flexible containers, tents, and marine supplies for over 20 years. The company waited for the right time to enter the American market, and when it did, it was ready to back the effort with publicity, parts and an active dealer network.

The distributor for the U.S., Canada, and the Caribbean is Franco Rossi of Rochester, New York. Franco was a frogman in the Italian Navy, and is still an avid diver. He feels the Radhial is one of the few boats designed specifically with divers in mind, and plans to gear his sales efforts around that part of the market.

Franco recently flew out to California to bring our test boat, the 955 R, flagship of the Radhial fleet. The R stands for the Raid model, featuring stronger, thicker floorboards, the mahogany foredeck, and both inner and outer grablines. The

smaller boats also come in the more basic Touring model, beginning at 11 feet. But the 15 foot 955 is offered only in the Raid configuration. At 225 pounds, it is heavy for an inflatable boat. But its wide, tapered tubes provide buoyancy to carry as much as 2250 pounds.

The color of all Radhials is a bright red-orange. Everything about our test boat displayed rugged, quality construction. The bolted-in transom is made of 16 plies of marine mahogany. Economy boats have fewer, thicker plies. The extra plies provide more strength. Two self-bailing plugs are at the base of the transom. The

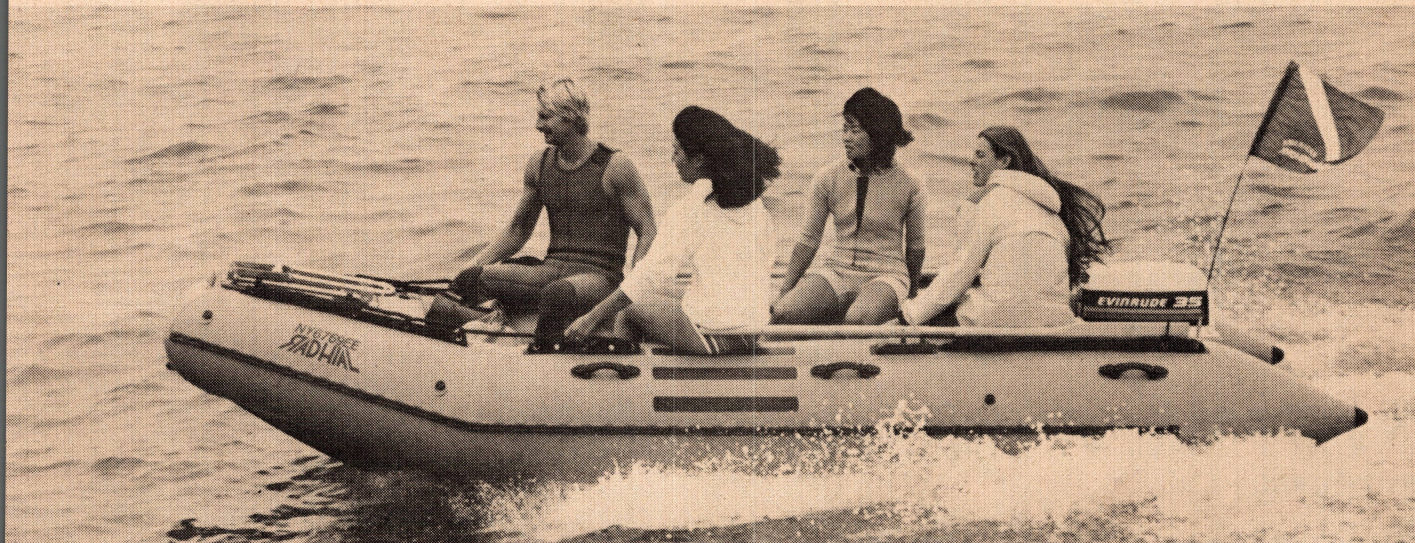
sides, as well as a fifth one on the bow. The lift handles have been tested on a davit carrying the boat with a motor, four divers and full ocean gear. Like all fittings, they are bolted through the skin to an underlying baseplate.

Standard equipment on the 955 R includes oars, a pressure gauge, a double action hand pump, and a repair kit. Spare parts supplied include a valve and even an extra inner tube. An impressive list of options is available which includes remote steering and seats equipped with shock absorbers. Of more interest to divers are launching wheels, a tonneau cov-

sides of the bag have air chambers and the bottom a water ballast chamber, so it floats upright if it falls overboard.

To top off the picture, the stern sported the standard flagstaff from which flew an optional divers flag.

We loaded the Radhial with five passengers and two sets of dive gear for its trial run. A 35 horsepower Evinrude engine brought the load up to a plane easily, without the use of full throttle. The boat handled tight turns with no skidding or cavitation, and held its course in the smooth sea with no steering effort. The ride was amazingly true and stable, with



motor mount is also mahogany, to reduce vibrations, according to the manufacturer. However, I would like to see it made of aluminum for security.

The floorboards are also made of marine plywood, and are kept in place by aluminum stringers. The two part wooden keel runs the entire length of the boat, and fits into the transom. This transfers thrust through the entire hull rather than concentrating it on the transom. The result is a very rigid boat with less flexing and less wear along the sides where the floorboards fit. The keel forms a pronounced deep V-hull, reminiscent of the hybrid inflatables with fiberglass hulls.

Our test boat was in its basic form, set up for diving. An optional folding ladder was strapped to the wooden foredeck, and a large carrying bag for dry gear was suspended below it. A pair of brackets holding two tanks each was bolted to the floor. Additional tanks can be stowed on the floor, or stood upright and held in place by the inner grablines. Four rugged plastic carrying handles were on the

The Radhial 955 R inflatable has a wooden front deck and keel. It can carry up to five divers. The boat's outer skin is vinyl/polyurethane on Trevira cloth, and all seams are electronically welded rather than glued.

SPECIFICATIONS RADHIAL 955 R

Length.....	14'11"
Width.....	6'11"
Interior width.....	3' to 3'3"
Tube diameter.....	16" to 23" (tapered)
Chambers.....	3 with 3 separate internal bladders
Floorboards.....	Mahogany plywood/aluminum stringers
Keel.....	Mahogany plywood
Exterior fabric.....	Vinyl/polyurethane on Trevira
Inner tubes.....	Polyvinylchloride
Overall weight.....	225 lbs.
Capacity.....	9 (5 divers), 2250 pounds
Horsepower range.....	10-55 (40 hp for diving)
List price.....	\$3,695

er which rolls forward to form a soft bowdodger, a flexible tank for fuel or water, and surface divers float which doubles as a current line. A waterproof bag carries clothes, lunches or camera gear. The

none of the bounce usually associated with inflatable boats. Just to test its handling, I crossed another boat's wake at full throttle. In most inflatables, this maneuver would jar your fillings loose. The Radhial cut right through the two foot wake the way a well designed rigid hull would. The secret, of course, is the wooden keel and the deep V-hull; but I have tested other wooden keel inflatables which didn't demonstrate the stability of this one. On the Radhial 955 R, it works.

The Radhial is an exciting addition to the American inflatable boat scene. Carlo Rossi feels it represents the future, with its vinyl exterior and double hull construction. The material is impervious to sun, gasoline, seam rot and most solvents. Rossi believes in the boat to the extent of backing it with a ten year warranty in this country. If he can educate American buyers to accept a plastic inflatable, he's got a real winner.

The 955 R lists for \$2,995. For information contact the distributor at 136 Charwood Circle, Rochester, New York. 

Efcom's SC-100M



A wireless u/w communications system BY HOWARD HALL

For many years there has been a demand for an underwater wireless communication system that works. Unfortunately, the creation of a functional system is not as simple as placing a walkie-talkie in a plastic bag. In order to transmit any distance with radio waves, a diver would have to carry enough batteries to ballast a submarine.

Designers of underwater wireless systems have found that sound waves in the ultrasonic range work best. However, many things underwater produce sounds that are then picked up by the ultrasonic receiver. Exhaled bubbles are the worst offender. In early designs of ultrasonic communications devices divers were forced to listen to the roar of their own exhaust bubbles, and the exhaust bubbles of their dive buddies, amplified through their earphones. Sifting through this barrage of roaring bubbles and static for a clear word was almost impossible.

Last summer I worked on a scientific film about dolphins for the Living Ocean Society. It was of great importance that observations of dolphin behavior on the surface be correlated with underwater observations. This meant we had to use an underwater wireless system. Fortunately, we chose Efcom.

Efcom Communications Systems, Ir-

vine, California, has overcome most of the problems that have plagued underwater communications. In recent years the company has perfected a functional wireless system that meets the needs of commercial, scientific and sport divers. It's called the SC-100M Wireless Underwater Communication System and it really works.

Efcom's Noise Cancelling Microphone eliminates the sound produced by the diver's bubbles as well as other breathing background noise. Unlike most microphones, the Efcom allows sounds to enter on both sides. Sounds that enter at both sides simultaneously, however (like breathing and bubble noise), are cancelled out. Only sounds that enter the mike from one side are transmitted.

The SC-100M incorporates a voice activated transmitter (VOX). This feature virtually eliminates the transmitted sounds of the diver's own breathing and the sound of his buddy's breathing. The transmitter turns on only when the diver begins speaking. In addition, the unit includes internal squelch circuitry which entirely eliminates static when the transmitter is inactive. When no one is speaking, the divers experience welcome silence instead of roaring static.

The range of the SC-100M is about

550 yards under optimum conditions. There are, however, numerous conditions that can have negative effects on the transmission and reception of ultrasonic waves. Any obstacles in the path of transmitted waves can hinder reception. Coral reefs or rocks can greatly reduce the range of the unit if they are between the transmitter and receiver. Even the diver's own body can interrupt the waves.

Several other factors may influence the Efcom's range. Bubbles produced by other divers, kelp, or thermoclines may hinder its performance. Thermoclines can influence diver to boat communications especially.

Although there are a variety of factors that may reduce the optimum range of the SC-100M, communication over 550 yards is seldom necessary underwater. Dive buddies are seldom that far apart and divers rarely wander that far from their dive boat. If, however, increased performance is necessary, Efcom produces an upgrade for the SC-100M called the SC-110M Power Booster which effectively doubles the optimum range of the unit to over 1000 yards.

The SC-100M is powered by a 12 volt nickel-cadmium battery pack. The pack provides six to seven hours of actual use and can be recharged externally. An LED battery condition indicator allows the diver to continuously monitor the charge on the batteries. A water activated switch automatically turns the battery on when the diver submerges and turns it off when the diver exits the water.

One of the major problems of using underwater communications has been the mouthpiece. It has to allow unhindered movement of the lips but not impede breathing. Efcom has confronted this problem by making the SPM-1 AGA full facemask available with their communications systems. This is by far the most comfortable full facemask I have ever used. Its slight, positive pressure seal totally eliminates accidental flooding. And, since the mask is continuously flooded with cool, dry air, there is no need to defog it before diving.

The voice activated microphone is positioned just in front of the diver's lips and the full facemask allows good enunciation. The waterproof earphone is about the size of a silver dollar. It is placed beneath the mask strap against the diver's temple or other bony part of the skull. The sound from the earphone is transmitted through the skull bones to the inner ear.

The Efcom SC-100M system has recently been approved by the U.S. Navy for military use. The SC-100M costs \$995, the AGA full facemask, \$495. For further information contact: Efcom Communication Systems, 18851 Bardeen Avenue, Irvine, CA 92715. 

Scuba Quiz

Category: Boat Diving

By Dennis Graver

Space is limited aboard boats. Owing to space limitations and safety, certain rules and recommendations have evolved concerning the handling of equipment. Find out if you are a good boat diver with this month's questions. The answers are on the following page.
NOTE: Select all correct answers. Some questions have more than one correct response.

1. When stowing dive equipment aboard a boat, one should:

- ☐ A. Pack bags first with items needed last
- ☐ B. Plan to work out of and into the gear bag
- ☐ C. Secure it to prevent loss or damage
- ☐ D. All of the above

2. Arrange the following methods of donning a tank aboard a boat from the most desirable to the least desirable:

- ☐ A. Have your buddy hold the tank while you put it on
- ☐ B. Raise the tank up and over your head and lower it into place
- ☐ C. Stand the tank up, then sit down on the deck and put it on
- ☐ D. Set the tank on some part of the boat about waist high, then have your buddy steady it while you put it on

3. Which of the following statements regarding use of the weightbelt aboard a boat is incorrect. The weightbelt should:

- ☐ A. Be donned by stepping through it while holding the ends
- ☐ B. Be donned before the tank when a jacket-type BC is worn

- ☐ C. Not be worn aboard the vessel between dives
- ☐ D. Always be removed before exiting the water

4. Which of the following statements regarding use of fins aboard a charter boat is correct:

- ☐ A. The fins should not be donned except at the entry point just before entering the water
- ☐ B. Only very experienced divers should walk on a boat when wearing fins
- ☐ C. The fins should be marked for quick identification
- ☐ D. Before exiting, the fins may be removed, but only as long as contact with the boat can be maintained

5. When entering the water from a charter boat:

- ☐ A. The regulator should be in the mouth
- ☐ B. The submersible pressure gauge and extra second stage should be held securely
- ☐ C. Have accessory equipment handed in after the entry
- ☐ D. The bottom of the scuba tank should be held with one hand

6. When exiting the water onto a charter boat:

- ☐ A. Equipment removed and handed aboard should be collected immediately upon exiting
- ☐ B. It may be easier to remove the tank first, and this may be easier to do in the water
- ☐ C. All equipment removed, except the tank and weights, should be stowed in your gear bag
- ☐ D. All of the above

7. Which of the following practices is generally looked upon unfavorably by crew members:

- ☐ A. Leaving a scuba tank standing unsecured and unattended on the deck
- ☐ B. Dropping the weightbelt on the deck
- ☐ C. Removing the backpack from the tank when the tank needs to be filled
- ☐ D. All of the above

8. Aboard a charter boat, which of the following practices is not recommended:

- ☐ A. Stowing all equipment, except tank and weightbelt, on your bunk
- ☐ B. Gathering *all* equipment, needed for a dive into one small area before suiting up
- ☐ C. Removing tips from spearguns and stowing the guns with the shafts pointing downward
- ☐ D. Having your buddy conduct a check of your equipment instead of a crew member

9. When diving from small boats with limited space, it is desirable to:

- ☐ A. Take only the minimal gear required for the dive
- ☐ B. Partially suit up before getting underway
- ☐ C. Don scuba gear in the water
- ☐ D. All of the above

10. When exiting the water into a small boat with a high freeboard, the recommended procedure is to:

- ☐ A. Remove the tank and the fins
- ☐ B. Remove the tank, weightbelt, and fins
- ☐ C. Remove the weightbelt and fins
- ☐ D. Remove the tank and weightbelt

Scuba Quiz

Answers: Boat Diving

1. D. All of the above. Divers need to work efficiently with their equipment aboard boats, using as little space as possible. Be sure all gear is well secured to keep it from sliding or falling.

2. A, D, B, C. Sitting on the deck places the head just about even with the bottom of a tank someone else is wearing, and is a great way to get hurt. Raising the tank overhead can injure someone else. Setting the tank on some part of the boat probably won't do the paint or varnish there any good. A buddy, should help, and donning the tank is one place where he or she should be put to use.

3. D. Always be removed before exiting the water. On many boats, especially larger charter boats, this isn't necessary. Weightbelt removal can result in lost weights, lost weightbelts and frustration. Removal is a good idea when a few divers are diving from a small boat, but may not be when many are diving from a large vessel.

4. A, C, D. Many fins look the same, so identification is quite necessary. Fins are not to be worn aboard the boat when the diver must move about. It's hard enough to maintain balance without them. A diver, especially if wearing booties, needs fins to move efficiently in the water; so be sure to maintain contact with the boat when removing your fins.

5. A, B, C. Accidents have occurred when divers became entangled just beneath the surface following an entry. Use your regulator. A gauge or an extra second stage hanging up on the boat can halt an entry abruptly. Hold the hoses to make sure they are clear. Holding the scuba tank is *not* necessary, however, and is merely a carry-over from the old days when webbing was attached directly to tanks and backpacks were not available. Of course, accessories such as cameras and spears should be handed in after entering.

6. D. All of the above. Equipment can pile up, get picked up by mistake, or fall overboard if not collected promptly after exiting. On boats with steep, slippery ladders, or when a person isn't particularly strong, tank removal may be wise; and it is easier to remove the tank in the water than when trying to hang onto the boat. All good boat divers work into and out of their gear bags.

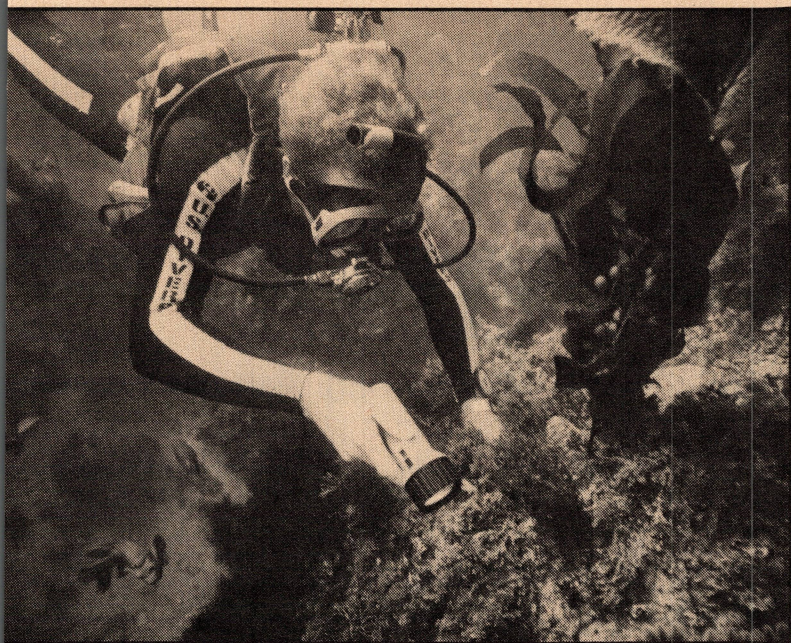
7. A, B. Leaving a tank standing unattended can result in valve damage and toe injuries. Boats are unstable. Dropped weightbelts can chip paint, dent the deck and also cause injuries in tight quarters. Backpack removal usually makes tank filling easier. On some boats, the fill tanks won't accept tanks with the packs attached.

8. A, B. Only items which are not meant to get wet should be stowed in bunks. Also, wet divers should not enter dry areas of the boat such as the bunk area. Gathering equipment sounds like a good idea, but isn't because it actually reduces the available room, e.g.; a tank takes more room when lying on the deck than when secured to the rail.

9. D. All of the above. In the limited space aboard boats, it can be frustrating, cumbersome and even hazardous to gear up for diving. An uncluttered deck, donning suits on shore, and donning tanks in the water can help increase safety and enjoyment when diving from small boats.

10. D. Remove the tank and weightbelt. It can be difficult, if not impossible, to get aboard a small boat unless the tank is removed. Removing the weightbelt may help and may prevent damage to the boat. The fins can help the diver kick aboard. Short lines hung over the side of the boat with clips attached can be used to hold equipment while the diver climbs aboard.

Diving from a boat offers some great opportunities. However, for safety and enjoyment it is important that correct procedures, such as those outlined in this quiz, be followed. Did you get seven or eight correct? That's what a good diver should score. If more than four were missed, you need some training in boat diving procedures. Anchors aweigh!



photo/Bonnie J. Cardone

Scubapro Dive Lights

BY JIM WALKER

A dive light is a must for night exploration, and it can be nearly that important during the day: A small, handy light can add color to a deeper dive and can illuminate those small cracks and minicaverns an underwater hunter needs to explore. Such a light can also help a photographer plan and position strobe shots in dim light.

Scubapro offers two lights which are bright enough for nighttime use, yet small enough to carry just in case extra light is needed during the day.

The Scubapro Scubalight 3 (catalog number 30-015-000) is shaped like a large, conventional flashlight and is just under 11 inches long. It has a slight negative buoyancy which allows the diver to set it down on the bottom if necessary without risking it floating away.

The Minilight 8 (catalog 30-017-000) is also flashlight shaped, but is only seven inches long. It is small enough to fit in the pocket of most BC's. With the option of operating the Minilight 8 with either four or eight size AA cells, the diver also has a choice between slight positive buoyancy or slight negative buoyancy, respectively. With four cells the Minilight will float beam-up; with eight, it sinks.

Both lights are made of bright orange ABS plastic. This material gives strength and light weight. Both lights have sliding magnetic reed switches which eliminate through-housing perforations, and both have a clear butyrate lens which screws down, making a visible seal against an O-ring. The lights are rated for depths of up to 200 feet.

Each light has a reflector with a vacuum deposited aluminum coating resistant to scratches and corrosion from fingerprints, and both lights come with lanyards

which can be adjusted to fit snugly around a diver's wrist.

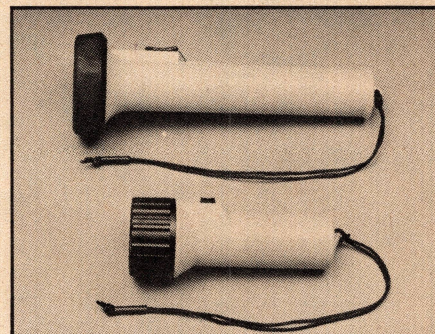
The Scubalight 3 has a wider, but less intense, beam than the Minilight 8, but with three fresh size D alkaline cells, using the PR-3 bulb, it can operate for up to 13 hours. (Ni-cad cells can be used in either light.) The Scubalight 3 has a locking switch and a protective, black rubber cover which slips over the lens. The PR-3 bulb is rated to burn for 15 hours.

The Minilight 8 has a black plastic lens collar which presses on. Behind the reflector is a snap-in clasp for carrying an extra bulb. The light comes with a high intensity bulb (PR-13) and a lower intensity bulb (PR-17). The PR-13 will burn for 14 hours and the PR-17 will last 30 hours. With each Minilight 8 Scubapro supplies a chart which gives the burn times for various bulb/battery combinations.

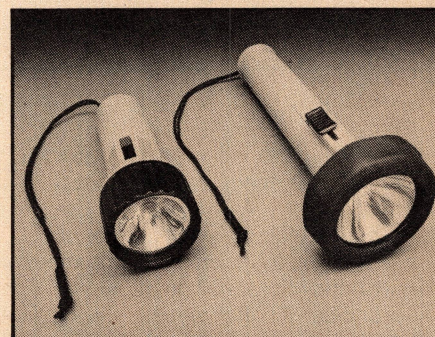
The Minilight 8 puts out a surprisingly bright beam with either bulb. With four size AA cells and the PR-13 bulb it will provide usable light for nearly three hours. With eight cells this time can be extended to roughly three times that figure. The lower intensity bulb will, of course, lengthen these burn times.

The Minilight's batteries slip into two packs of four, and these packs attach to the bulb baseplate by snaps like the terminals of a transistor battery. The whole system—bulb, baseplate, magnetic reed, and battery packs—slides out of the light as a unit.

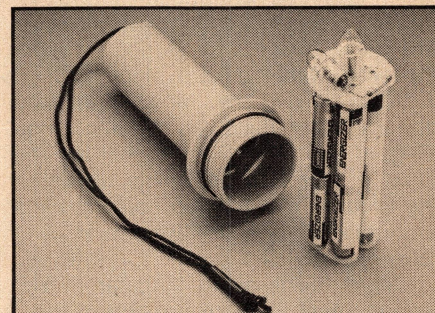
The Scubalight 3 costs \$26 and the Minilight 8 costs \$34. Batteries are not included, but are available at drug stores, camera shops, etc. Both these bright little lights are available at your local Scubapro dealer. 



The Scubalight 3 (top) is just under 11 inches long. Minilight 8 is seven inches.



Both lights have lens covers and adjustable lanyards. Below: The Minilight's battery/bulb system slides out as a unit.



ANGLER'S V-22

The Modified Hull Provides a Smooth, Steady Ride



TEXT AND PHOTOGRAPHY BY STEVE LUCAS

Choosing the right boat to suit your particular needs can sometimes be a formidable task. As with all your personal dive equipment, there will be certain features that you will want and need and others that may not be what you desire. The final choice will often depend on the type of diving you do. Photographers usually desire good dry storage and a place to get their cameras out of the weather when changing film. Spearfishermen and tropical collectors often want plenty of room and livewells for storing the catch. Knowing what you are planning to do with your diving time will often influence the eventual choice you make in a boat. Regardless of the direction your activities take, it is probable that your needs can be filled with one of the boats available from the Angler Boat Corporation of Miami, Florida.

Angler builds nearly 20 different models, many of them suitable for diving. A

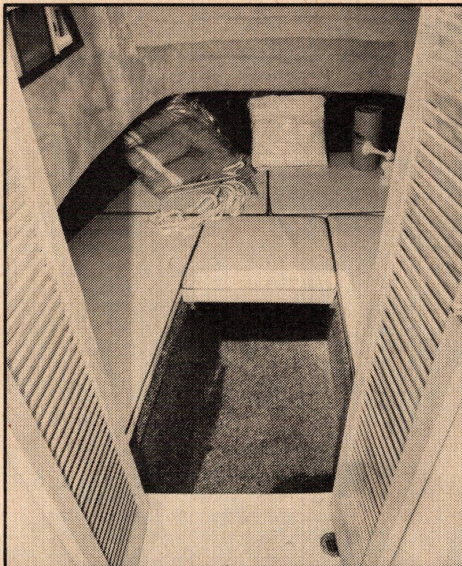
pair of 22 foot hulls quickly caught our attention. Either is capable of being outfitted to please most every diving enthusiast. The V-22F is a wide-open fisherman with plenty of room. The V-22W has more dry storage than most underwater photographers could ever find a use for with its nicely appointed cuddy cabin.

The basic hull of either boat is identical. Angler has chosen to build this all fiberglass boat with a 17 degree modified deep V design. The designers decided to use this modified design because it rides much smoother while at anchor. Thus, divers are less likely to suffer from sea sickness while diving from this modified hull—there is less rolling. The additional stability will certainly be appreciated by non-divers left on the boat to observe the divers' activities.

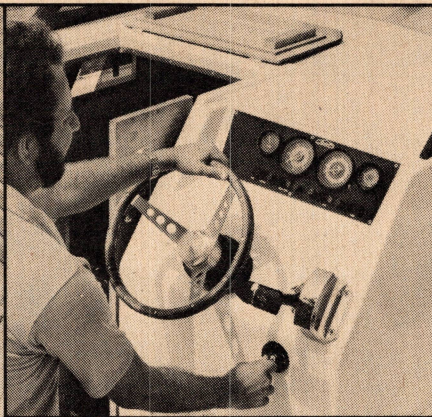
Both hulls come equipped with bow railing, twin molded captain's chairs, insulated fish boxes and windshields.

Either can be equipped with outboard or inboard/outboard engines. Power is available up to over 300 hp and in the I/O configuration there are some 14 different engine packages available with either gas or diesel. Fuel is supplied from the standard 65 or the optional 110 gallon aluminum tank.

The V-22F center console has been a standard with Angler for some time. There is plenty of storage under the console as well as the insulated fish box which can double its purpose. Under the forward console seat there is an insulated ice box that can also be used to store bulky items if necessary. Along the gunwales there is space to install the optional tank racks for up to six tanks each on either side of the hull. Since the boat is eight feet across the beam there is space for six divers with room to spare for all gear. Normally expected options such as Bimini tops, dive platforms, spray hood



The Angler V-22 boat comes in two versions; an open center console style (V-22F) and a walk-around cuddy cabin model (V-22W). Both have a modified deep V hull. The cuddy cabin version, pictured here, has plenty of dry storage area, as well as sleeping room for two. Options include a marine head and full galley.



V-22F/W SPECIFICATIONS

Centerline Length.....	22'
Beam.....	8'
Max. hp.....	235/300
Modified V Hull.....	17 degree
Molded Depth.....	49"
Fuel Capacity.....	65 gal.

and side curtains are readily available and your dealer can fully advise you of all the options to consider. One that certainly is well advised for both models is foam flotation. Owing to the boat's size it is exempted by the Coast Guard from having flotation installed as required standard equipment.

The V-22W walk-around cuddy cabin is a new addition to the line. The obvious advantage to divers requiring plenty of

dry storage is the large enclosed cabin. It would be difficult in a hull this size to get more dry space for cameras, fragile gear and people than can be had in this boat. For overnights, the design adds an entirely new dimension to small boating. Options include a marine head and a complete galley unit. The interior of the cabin has two V berths large enough for a couple to sleep comfortably. It is fully carpeted and has sliding windows on

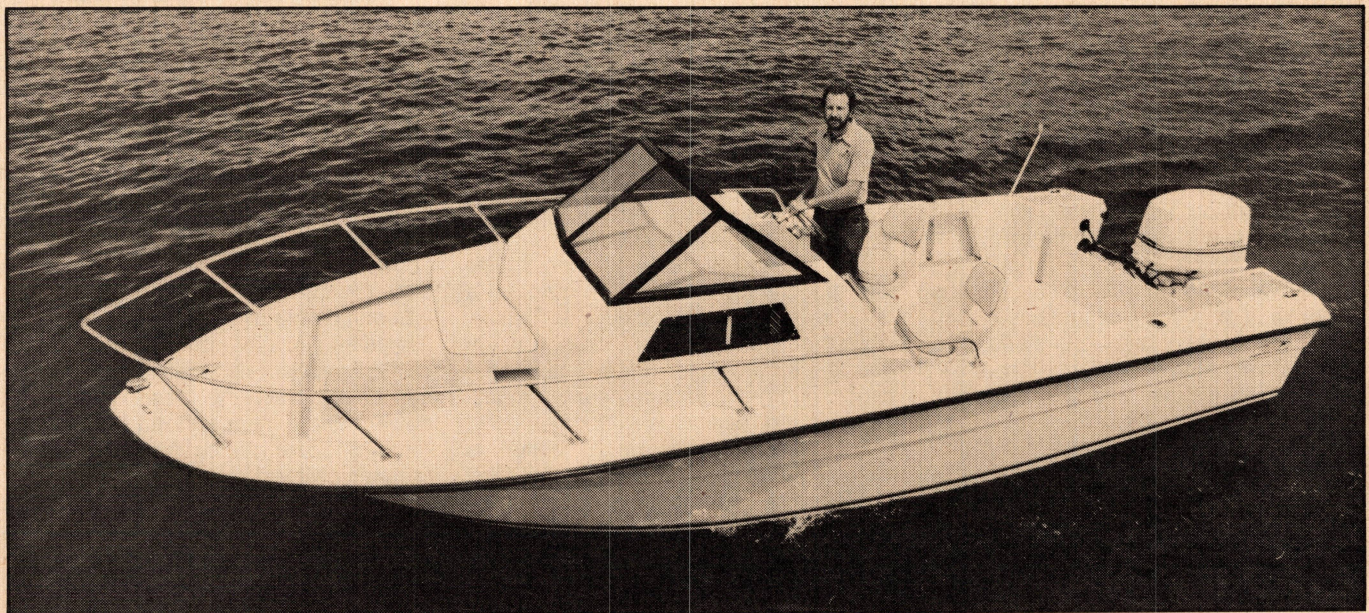
either side. One advantage to the cabin design is that it does not fully take up the forward portion of the boat. You can walk completely around the cabin and front half of the hull. In addition to being a walkway, the area can easily double as storage for much of your dive gear while underway. Wetsuits, regulators, masks, fins and gear bags can be placed fully forward, neither cluttering the deck nor the cabin.

The design does have a few disadvantages, chief of which is that the boat cannot carry as many passengers. Some space for tank racks is also lost owing to the differing internal configurations of the walk-around and the open fisherman. However, for many, the advantages will take precedence over the disadvantages.

The SKIN DIVER test boat, supplied by B & F Marine, Inc. of Miami, performed very nicely on the calm waters of Biscayne Bay. She jumped up on a plane quickly and handled very well. On calm water she rode comfortably and dry. It would be expected however to get some spray in the boat while running in rough water owing to the hull design.

Prices are well within the range of what would be expected for a boat of this size. The V-22F open fisherman without motor or trailer in the outboard design has a base price of \$7,950. In the I/O configuration prices range from \$12,700 to more than \$17,000 for gas engines, and start at \$22,850 for diesel. The V-22W walk-around has an outboard base price of \$10,300 with gas I/O starting at \$15,050. The diesel version is about \$25,200.

Further information about either model or the name of a dealer in your area can be obtained by writing: Angler Boat Corporation, 4450 N.W. 128th St., Miami, Florida 33054.





the Waterlung Snapper

A One-Handed Goodie Bag

TEXT AND PHOTOGRAPHY
BY MARTY SNYDERMAN



Quick as a wink, it's in the bag! That is the catch phrase describing Waterlung's new goodie bag, the Snapper. It enables you to be your own "bag man" because it can be opened and closed easily with one hand, leaving your other hand free.

Until the advent of the Snapper, divers had to contend with the risk of bagging their own game or finding someone who would follow them, dutifully opening and closing the bag whenever there was game to be stuffed inside. Most divers are willing to split the catch with their bag men, but the problem is really that most of the thrill lies in capturing the prey, not in carrying the bag.

The Waterlung Snapper eliminates the need for a bag man because you can open and close it with one hand. I've seen a diver catch seven large lobsters in less than 15 minutes and stuff each one inside the Snapper by himself.

As with most goodie bags, the Snapper's mouth is framed by two pieces of stainless steel joined together at the widest part. The frames pull the mouth apart and keep it open. Outside and on one side of the Snapper's mouth is a spring loaded rod connected to a double han-

dle. The Snapper is held shut by spring tension. When the two handles are squeezed together, the mouth opens to a diameter of twelve and one-half inches. When you let go of the bottom handle the spring forces the mouth shut. You needn't worry about the bag opening accidentally: The tension exerted by the stainless steel spring is considerable. Some divers will prefer less tension to make the bag easier to open. There are four notches on the guide that joins the bottom handle and the mouth frame. Sliding the spring along the guide to the various notches alters the tension by lengthening or shortening the spring.

The Snapper is 22 by 28 inches. The top 18 inches of the bag are made of a durable nylon impregnated with plastic, while the bottom is nylon mesh. It is impossible for a fish, lobster or other game to get snagged in the bag near the mouth because the material is slick.

The all mesh section at the bottom is advantageous for several reasons. First of all, you can see into the bag so you do not lose track of your take and accidentally exceed a legal limit. Second, the mesh allows water to drain out. Also, the mesh in the bottom often entangles your

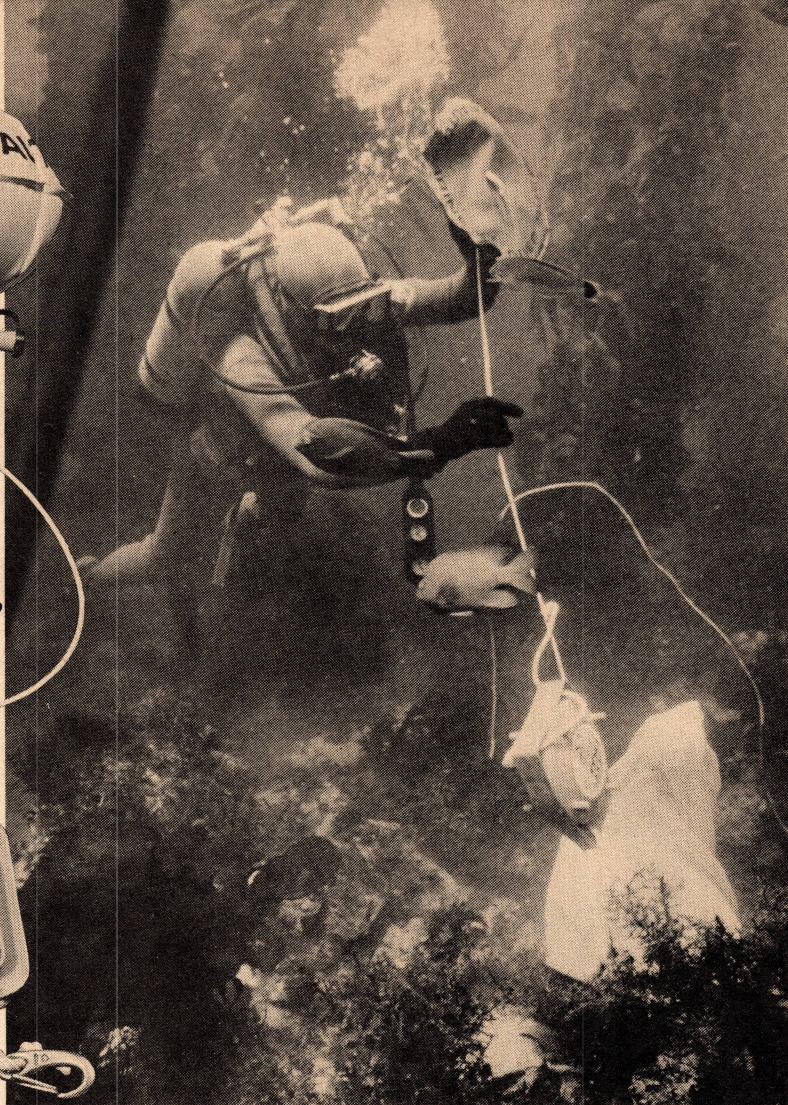
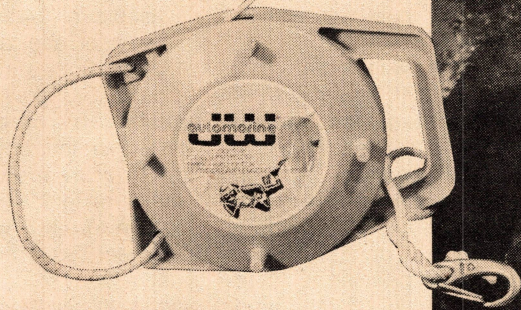
catch. That means that the next time you open the bag, nothing escapes.

The half nylon/plastic, half mesh design will be appreciated by spearfishermen, shellfish seekers and treasure hunters alike, but is a feature that will be most valued by serious lobster divers. Lobster legs, spines, and antennae have an unbelievable affinity for mesh bags. As soon as the two come in contact they get entangled. The smooth, slick mouth of the Snapper lets lobster slide into the bag easily, while the mesh keeps them down in the bottom and out of the way.

The Snapper comes in bright yellow. It requires no extra maintenance, just rinse in fresh water and let dry when your dive day is over. The suggested retail price is \$39. For further information contact: Waterlung, P.O. Box 2407, Huntington Park, California 90255. 

Automarine helps
you locate your
sunken goodies

MARKER BUOY



photo/Bonnie J. Cardone

TEXT AND PHOTOGRAPHY
BY HOWARD HALL

Finding treasure is a dream of nearly every sport diver. It's the ultimate something for nothing fantasy. What diver hasn't had at least one night filled with subconscious imaginings of swimming over a sandy bottom and suddenly stumbling upon some ancient, decaying, wooden crate filled to the brim with shiny gold ingots. It's a dream that brings a grin to a sleeping diver's face and beads of ecstatic perspiration to his brow.

Certainly, the prospects of stumbling across such a treasure are quite remote. But, treasure takes many forms to sport divers. And, in any case, the problems are the same: how can you mark the salvage item so you can relocate it after properly equipping yourself?

The Automarine Marker Buoy is the answer. This is a device the diver carries with him and can attach to anything he finds. It consists of an inflatable float, 100 feet of line, a reel and lanyard with a stainless steel hook.

The float is a small PVC/polyester bag which inflates to about 14 inches in diameter. When deflated the bag is flat and easy to carry. There are two methods of inflation available for deploying the float.

It can be inflated orally by a small tube on the underside of the bag which incorporates a one-way valve. This permits easy and rapid inflation without manipulating any devices. The float can be deflated via the same tube by pressing your finger into the orifice or by using a small device attached to the tube's dust cover. Should the diver be in a hurry or low on air, the float also has a CO₂ cartridge attached to the underside which can be detonated by pulling a cord.

To prevent overinflation as the float ascends to the surface, Automarine has placed an over pressure relief valve next to the CO₂ cartridge.

Large, heavy duty plastic D-rings are placed at the top of the float and at the bottom. The line which tethers the float to the reel is attached to the D-ring on the bottom of the float. Additional lines can be attached to the ring at the top.

The reel is heavy duty plastic, seven and a half inches in diameter, with a large sturdy handle. The heavy glowline can be dispensed simply by pulling it out by hand or, when the buoyancy of the float is sufficient, the line will spool out by itself. The line is fluorescent orange and

The Automarine Marker Buoy is designed to be carried by the diver and attached to items discovered on the bottom. The float can be inflated orally or by an attached CO₂ cartridge. An overpressure relief valve is placed next to the cartridge. A large reel makes spooling in the 100 foot, bright orange float line an easy task.

just stiff enough to resist tangles.

When the float is to be retrieved, the diameter of the winder allows the entire 100 feet of line to be spooled quickly.

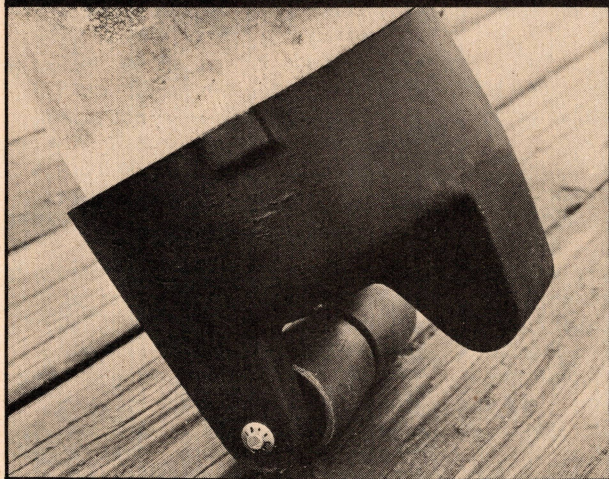
Not only can the Marker Buoy be used to mark objects for future salvage, it can be used by a photographer to mark photogenic locations or interesting marine life while he/she returns to the boat to reload or change lenses.

Another use for the Marker Buoy is to mark the position of the diver himself. And, the reel allows the diver to alter the length of buoy line.

The Automarine Marker Buoy retails for \$60. For further information contact: J.W. Automarine (USA) Corp., Old Road Lane, Mt. Kisco, NY 10549; or 5156 Pacifica Blvd., San Diego, CA 92109.



The Roller Boot features a tank boot of strong Zylar plastic, and polypropylene wheels on a 5/16 inch diameter stainless shaft. Shaft is held in place by snap rings.



Roller Boot

LET'S DO THE
and put your tank on wheels
with Seasport

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Just when you thought you had everything you needed to go diving, along comes the Roller Boot. What's that? Why, a scuba tank boot with wheels, of course.

A full tank with a backpack weighs about 40 pounds. When weight is integrated into the backpack, it can easily get as high as 60 pounds. They put wheels on luggage, don't they? Well, the Seasport company has put wheels on tank boots.

Seasport's premise is to reduce the amount of hand labor by bringing new technology into the manufacturing process. The Roller Boot was adapted from the Vector System, a new BC device recently introduced.

The Roller Boot is really so simple one wonders why it hadn't been produced a long time ago. It is just a plastic tank boot with a pair of wheels attached. But nothing is quite as simple as it appears at first glance and this product is worth a closer look.

The material used for the boot is a space age plastic called Zylar. It is stronger than Lexan or ABS. It won't rip or tear and has a 90 percent memory, unusual for a plastic, which makes it especially strong.

The wheels resemble those used on roller skates and are made of polypropylene. The axle is a five-sixteenths inch stainless steel shaft, eight inches long, held in place by snap rings in a retention groove. A one-quarter inch shaft was used in the early prototypes, but the thicker one won't bend. The wheels need no lubrication be-

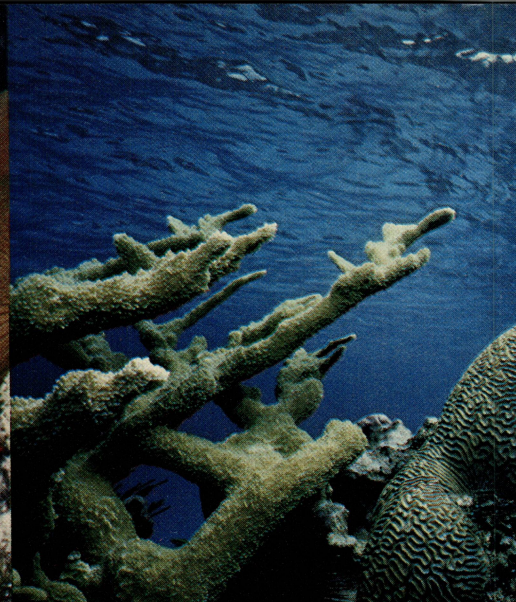
cause the plastic acts as its own lubricant. The wheels should last a long time, but when they wear out replacements are available for \$4.50.

To insert the tank, just stand it in the boot and tap it on the ground. Self draining is accomplished by means of holes drilled in the bottom. A small protrusion inside the base keeps the tank a half inch off the bottom to allow water to drain. Engineer Stan Sanders states that less tank surface is in contact with the boot than is the case with conventional, finned boots. Small bumps are also molded on the outside of the boot to keep the tank from rolling when placed on its side.

A wide post molded into the bottom of the Roller Boot gives it a tripod stance. Sanders warns, however, that the device was not intended for a standing tank—unless it is strapped in or placed in a rack—it is just a bit less stable when standing than a tank in a normal boot.

The wheels work well when towing a tank on any hard surface, from a street or sidewalk to a ramp or a boat deck. It will even work on hard packed dirt, but not in soft sand. When used with doubles, or with a weighted At-Pac, the Roller Boot will really be appreciated by all divers except those concerned with maintaining a macho image. It is available in sizes to fit both 72 and 80 cubic foot tanks. The retail price at your local dive store is \$18.50. For more information contact: Seasport, 18030 S. Euclid Street, Fountain Valley, CA 92703.

TOTAL

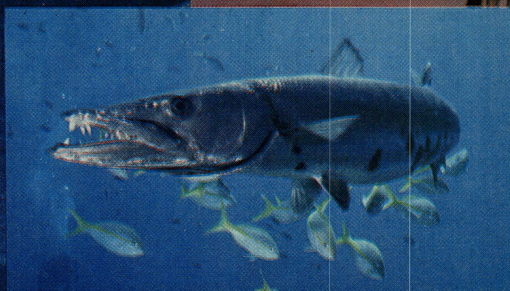
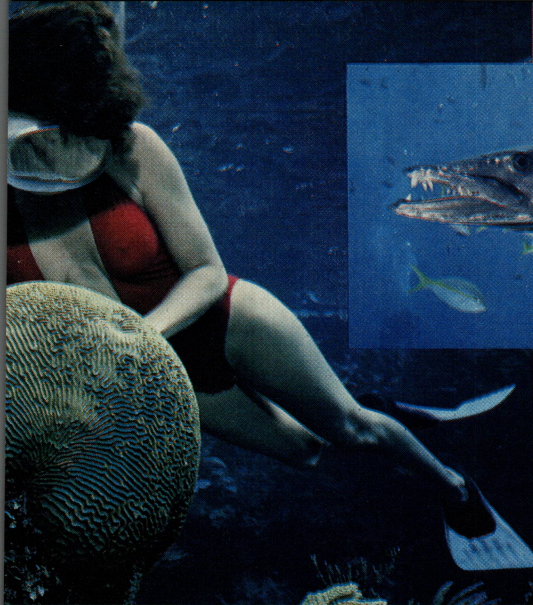


Penne Park



While the Florida Keys have traditionally been very resistant to change, even the "Conch Republic" is not immune to progress. If you have not visited the Keys for a few years, you will probably notice some differences. There is a new pipeline supplying fresh water to the Upper Keys so that water pressure is generally better. The highways are significantly improved and the new Seven Mile Bridge makes transit between the Upper Keys and the Lower Keys much easier and safer. There are more hotel rooms and condominiums. Time-share developments have proliferated. Restaurants exist in considerable abundance and offer cuisine ranging from seafood to Chinese, Italian or Mexican. There are movie theaters, and even some very nice bars. All of which may seem unremarkable until you realize that the bulk of this growth has occurred within the past four years.

Don't come to the Florida Keys expecting a metropolis however. Life here is still laid back, the weather is still balmy, and the waters are still warm and clear. In fact, most of the changes which have taken place are intended to provide bet-



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**TEXT AND PHOTOGRAPHY
BY STEPHEN FRINK**

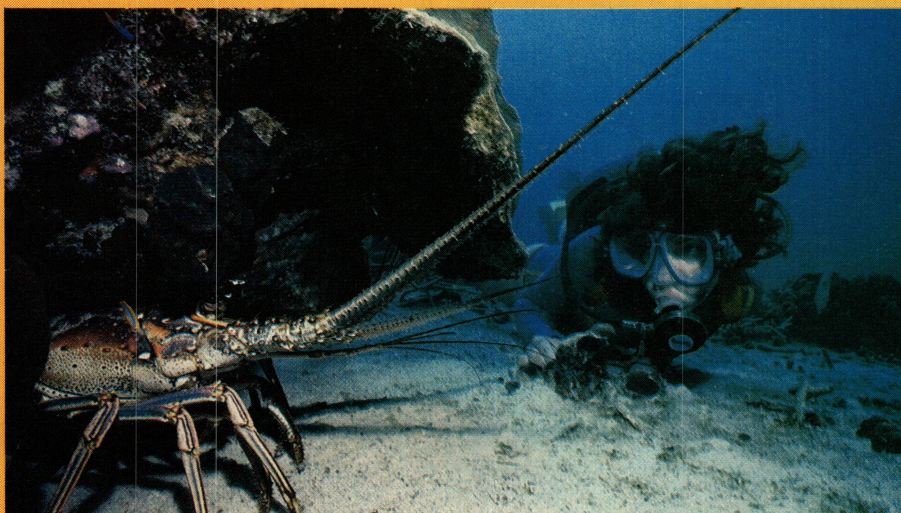
ter services to the tourist, the acknowledged mainstay of the local economy. But, as the indicators of development begin to emerge, comfort may be derived from the strong position taken by the dive operators of the Florida Keys to assure that the beautiful, yet fragile, coral reef will continue to flourish.

Concern for the marine ecology is not a new issue here and John Pennekamp Park is an especially fine example of a successful conservation program. As recently as the late 1950's, marine life was being wantonly depleted by coral collectors, shell hunters and spearfishermen. Perhaps it was typical of the times, but the coral reef was viewed by some as an inexhaustible resource. Fortunately for later generations, individuals such as Dr. Gilbert Voss of the University of Miami and Miami Herald newspaper editor, John Pennekamp, fought for the establishment of an underwater park and marine preserve off Key Largo. In December 1959, John Pennekamp Coral Reef State Park was established, and the waters from Key Largo to three miles offshore were protected by the state. President Ei-



Opposite page: A diver and large moray inspect each other near the Statue. Center: Snorkeling over brain and elkhorn coral, French Reef. Above: A barracuda near the City of Washington. Tropical sunsets and watersports can fill non-diving hours.

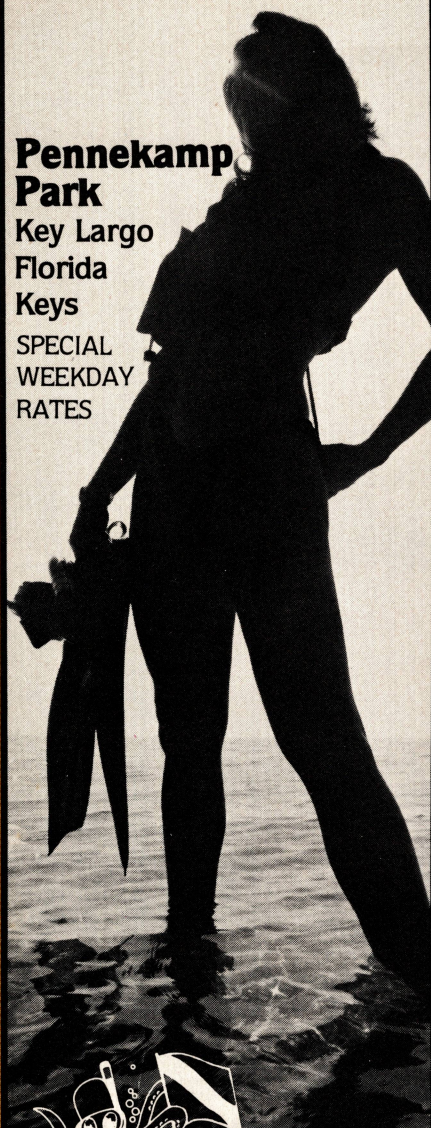
Far left: A school of grunts at Molasses Reef. Below: Big lobster at Carysfort Reef.



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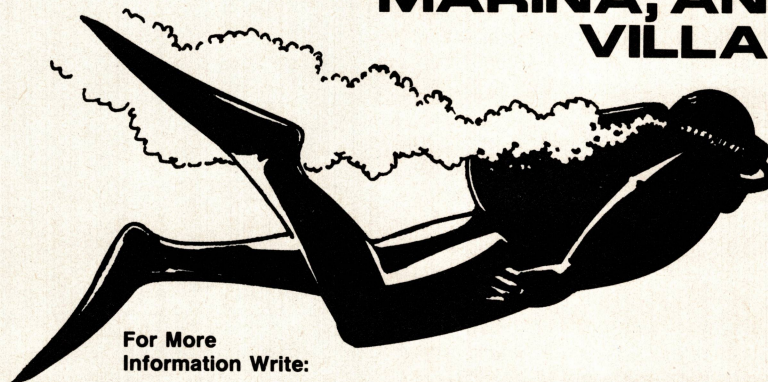
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senhower proclaimed the waters from the three mile limit to the edge of the continental shelf protected in a similar fashion and the marine preserve was born.

Once established, growth and improvement to the park was steady. By 1963 work had been completed on the marina and retail areas within it. Soon thereafter other dive shops outside the



Left: Photographer is dazzled by baitfish school at North Dry Rocks. Above: A cooney frowns for a photo. Sea life flourishes in Pennekamp Park's 100 square miles.

state lease area began operations transporting divers to the waters of Pennekamp Park. In July of 1966 formal dedication ceremonies were held for the underwater symbol of the park, the statue of Christ of the Abyss. By the 1970's, diving was steadily increasing in popularity, and the Florida Keys were already established as a world class dive destination.

Tourism to John Pennekamp Park has consistently increased, and last year a record 485,000 people passed through its gates and as many as 200,000 others were serviced by the several dive operations along the highway. These numbers may be misleading in that not all these customers were divers. Exact figures regarding the total number of scuba divers enjoying the excellent reefs and waters of Pennekamp are unavailable. The Park is over 100 square miles underwater and there are no DPV mounted policemen swimming about counting heads. But, the inescapable conclusion is that these waters are a premier American resource enjoyed by a significant segment of our diving community.

Pennekamp Park has fringing reefs which are not accessible from shore without a boat. Consequently, numerous dive shops transport divers to the reef and provide auxillary services such as scuba

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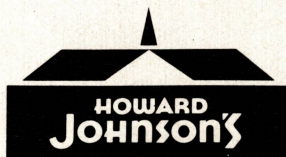
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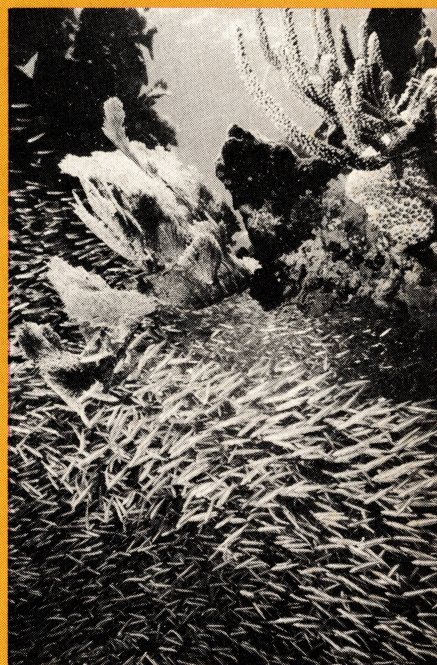
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instruction, camera rentals and film processing, equipment sales, air fills and photo instruction. While these shops may be in competition with one another, it is interesting to note that cooperation is the rule rather than the exception. This is especially evident among the member shops of the Keys Association of Diving Operators (KADO) where recent collaborative efforts have included an emphasis on both dive logs and C-cards as combined evidence of diver activity and competence, improvements in safety standards for boats and crews, destination promo-



A wall of baitfish patrols coral formations at North Dry Rocks. A system of mooring buoys has been placed in the Park to protect the coral from anchor damage.

tion, diver education and reef protection and conservation programs.

Within the boundaries of Pennekamp Park, the Department of Natural Resources is constantly seeking ways to further assure that conservation measures will be practiced. Anchor damage to corals has always been one major cause for concern. And, improper anchor placement is, in fact, quite illegal. Recognizing that educational efforts and law enforcement have failed to do the job in the past, the DNR, under the direction of sanctuary biologist, John Halas, has initiated a pilot program of placing mooring buoys in selected areas throughout the Park. The logic of this program suggests that if it is easier to tie up to a conveniently located mooring buoy voluntary compliance should be high. Consequently, 11 buoys have been placed on Molasses Reef and another six on French Reef. In the near future we can expect to see two more on

French, two at the Statue, four at the Elbow, six at Grecian Rocks, and three at Carysfort.

Although it may be too early to determine the total effect of the mooring buoy program, enthusiasm for the system is high among boat captains. The buoys are totally effective in terms of preventing anchor damage and offer other advantages such as easier and quicker mooring, more consistent identification of specific dive sites, and greater stability aboard the moored vessel. Halas further reports that owing to the success of the program similar installations will likely be installed in other marine sanctuaries.

Another interesting trend emerging among the dive operators is the desire to dive some of the lesser known areas of the preserve as a customer service. Owing to a combination of factors, reefs such as Molasses, French, the Elbow, the Statue, and the wreck of the *Benwood* have received the bulk of diver traffic over the years. Personally, I feel these are among the finest coral structures and healthiest fish populations in the Caribbean, but there is much more to Pennekamp than these areas of maximum promotion.

Some of the lesser known areas include some quite spectacular diving near Carysfort Reef. One in particular is the South Ledge, with its magnificent concentrations of coral and the drop-off to 60 feet just east of the Carysfort light. There are some massive sponge formations in the deeper waters off the Elbow, and a spectacular area of high profile corals swarming with glass minnows in the North Dry Rocks section of the Park.

The *City of Washington* is the remains of an island freighter run aground in 1917 and blasted apart as a hazard to navigation. Today there remains scattered wreckage with some unique backdrops for wide-angle work with models. In addition, some of the dive operators have been working with the marine creatures and have barracudas and moray eels performing daily.

Some of the shops have been offering a deep dive off the *Benwood* in 60-80 feet of water. This is most appropriate for smaller groups, and is occasionally taken as a drift dive as the current is often more extreme. There is a really beautiful ledge in 60 to 70 feet off French Reef and an exceptional area in 60 to 80 feet off Molasses. There are patch reefs on the inside of the fringing reefs that offer fish life not typically seen on the outside, particularly juveniles and macro subjects.

Despite the number of divers utilizing these waters annually, there are many areas of quality diving where nobody goes. One hundred square miles is an absolutely massive area to fully explore underwater. In addition, what is down there is always changing; I've been in the water at Molasses over 200 times and there has always been something new to experience each time.

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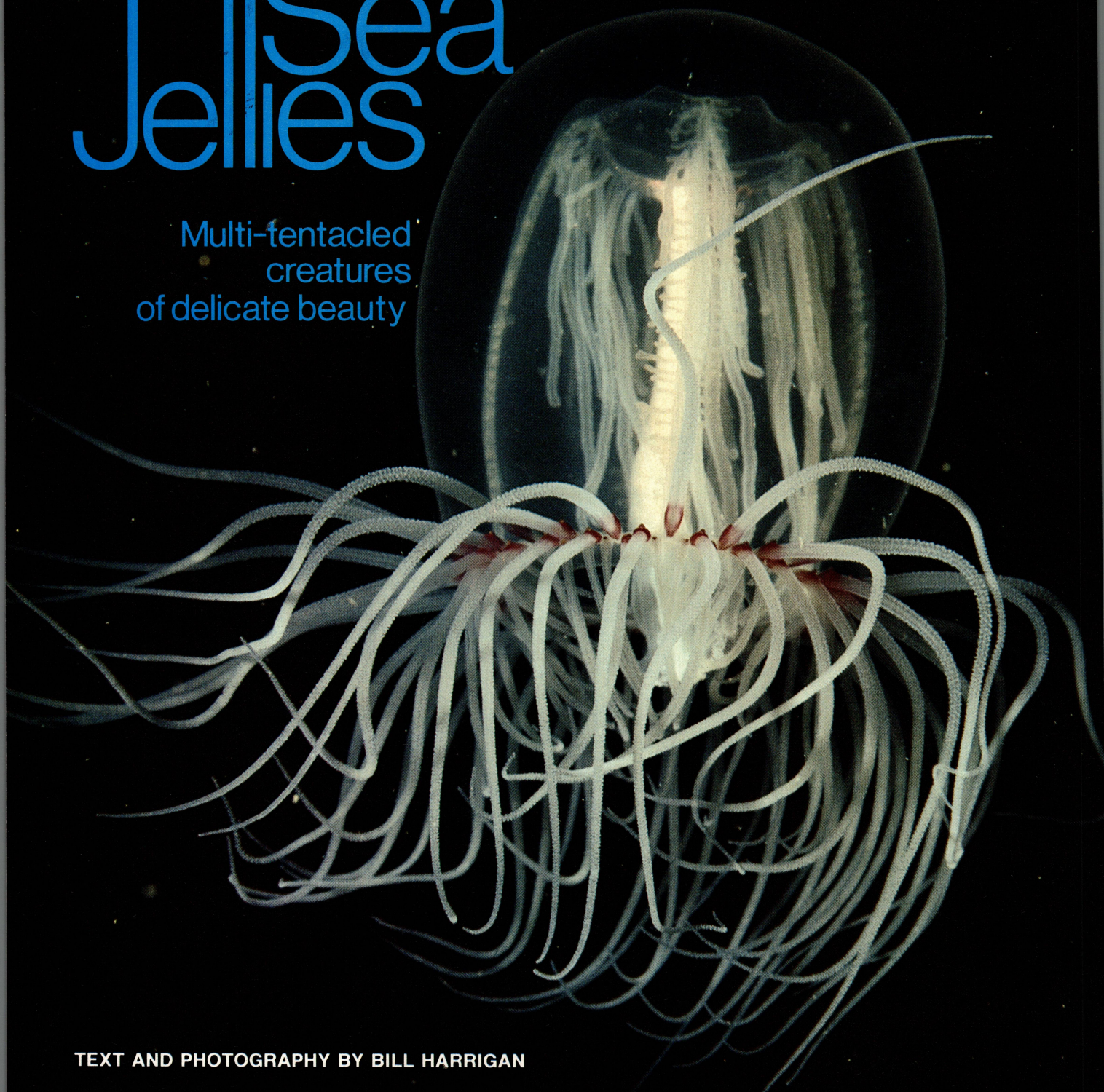
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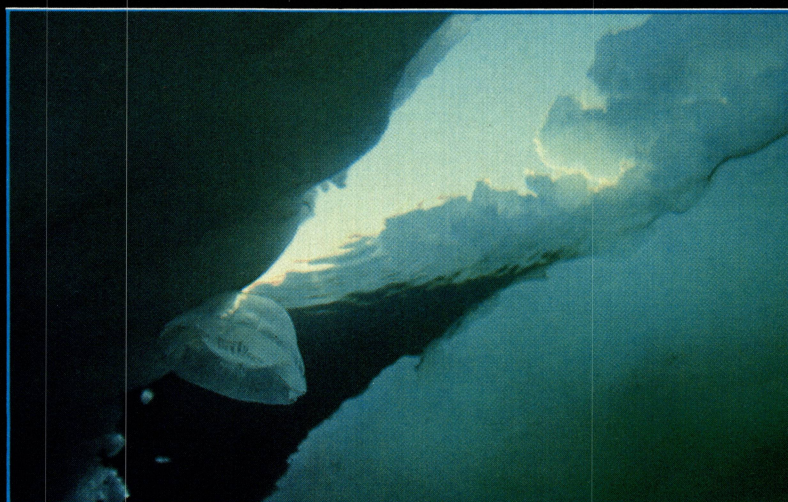
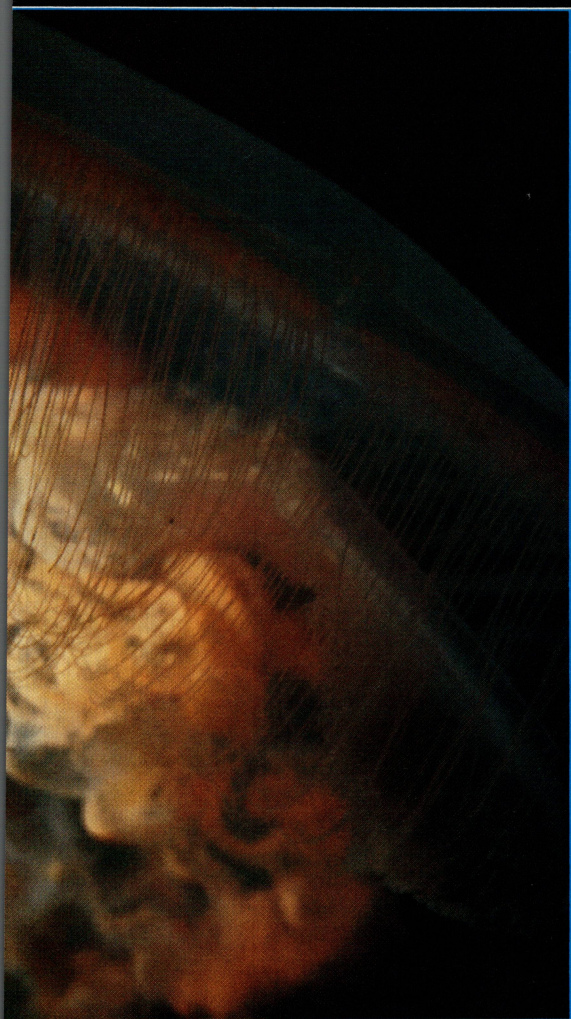
TEXT AND PHOTOGRAPHY BY BILL HARRIGAN

The jellyfish is a fascinating creature; ugly and squirming when you're trying to avoid it on the beach; majestically hypnotic when you see one pulsing slowly through the water looking like some type of miniature alien spaceship. Hanging in the water watching the slow, steady motions of large jellyfish seems to emphasize your own weightlessness and give the dive an unreal quality. The sen-

sation of being transported to another world is particularly strong if you are surrounded by several hundred jellyfish and have no bottom reference.

Jellyfish are members of a group known as cnidarians, which also includes sea anemones and corals. They are quite simple physically, consisting of two layers of cells which enclose a jelly-like material called the mesoglea. This simplicity

may seem surprising when you confront one of the larger species with its long trailing tentacles—but the body consists of only a single cavity with an opening for taking in food. Since each cell is in contact with water on one side, the jellyfish is able to dispense with such complications as a circulatory system or a digestive tract. It relies on contact with the ocean for the life functions of each cell.



Jellyfish can be beautiful when viewed from a diver's perspective. Opposite page: a small jellyfish floats in midwater near Kodiak Island, Alaska. Locations of photos, clockwise from left: King Island, Alaska; Amok Island, Alaska; Bering Sea; and Elliot Bay, Washington.

Jellyfish have a unique life cycle, and a variety of interesting physical shapes. Their average life span is only one to three months, and most begin life as an egg which has been fertilized in the water and sinks to the sea bottom, attaching firmly to the substrate. It develops into a polyp, which looks like a tiny palm tree an inch or so high. The polyp later becomes the second phase of the jellyfish life cycle

through asexual budding. This phase is called the medusa. The medusa is the free-swimming, saucer shaped animal that is normally recognized as a jellyfish. Not all jellyfish follow this pattern exactly, and in many species one phase of the life cycle or the other is greatly reduced. Even so, this all adds up to a pretty hectic schedule for a two month life.

The basic swimming motion of a jelly-

fish is the slow pulsing movement caused by rhythmic contractions around the base of the bell, or main body of the jellyfish. The Portuguese man-of-war, however, has modified the bell into a unique air cavity called the sail, which keeps the jellyfish at the surface. It projects upward into the air, catching the wind and pulling the animal along.

A close encounter with certain jellyfish can be a painful experience. This is owing to the stinging (nematocyst) cells of the tentacles. The cells are like little coiled one-shot spears, which are intended either to paralyze or ensnare. The severity of these stings to humans depends on the type of jellyfish, the total number of stings delivered to exposed skin, and the individual's reaction. Divers tend to be more aware of potential dangers in the water, and have less problems with jellyfish than other swimmers. In addition to nematocysts, many jellyfish have a network of cells which cause it to respond to light, as well as cells called statocysts which give it balance and provide a righting motion if it is tipped upside down.

Some creatures, commonly known as comb jellies, are often referred to as jellyfish, although they are actually a different animal altogether. They are generally translucent in appearance, and unlike jellyfish, they move by beating rows of comb-like cilia. Comb jellies are sometimes found suspended in the water in large numbers, making them appear very much like jellyfish. There is only one species of comb jelly that is known to possess nematocysts, however.

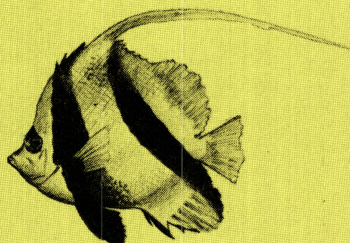
A beach littered with squishy jellyfish evaporating in the heat holds little appeal to anyone, but a large jellyfish shimmering in the reflected light of the midlevel water column has an other-world majesty of its own. >>>



The False Moorish Idol

(*Heniochus acuminatus*)

Fishes of the genus *Heniochus* within the butterflyfish family, Chaetodontidae, are very reminiscent of the Moorish idol—the only member of the family Zancidae. The false Moorish idol, so-called because of this resemblance, has the same elongated dorsal fin as the Moorish idol, a pointed snout and a white body with broad black bars. Like older Moorish idols, individuals of the genus *Heniochus* also resemble surgeonfishes (family Acanthuridae), in having pronounced foreheads, or bony horns above the eyes. □ In spite of these similarities, the false Moorish idol is a butterflyfish, characterized by brush-like teeth (chaetodont means bristle tooth) and behavioral patterns peculiar to the family. Butterflyfishes swim about the reef, often in pairs, probing into cracks and crevices with their snouts for food—primarily small invertebrates and filamentous algae. The false Moorish idol, sometimes called the poor man's Moorish idol or coachman, has been observed pushing head-to-head against another of its own kind: This behavior is either one of aggression or a preamble to mating. □ Like the Moorish idol, the false Moorish idol is a white fish with two broad black bars, one extending from behind the forehead through the pectoral fin



region, the other from behind the elongated dorsal fin to the top of the anal fin. A third black marking, less distinct, extends through the eye region. Butterflyfishes characteristically have a dark stripe through the eye, which is said to serve as camouflage against predators which may calculate the movement of the butterflyfish by the location of its eye. The filamentous dorsal fin of the false Moorish idol is white, an extension of the broad white region below it. The pectoral fin is yellow, as is the posterior dorsal fin and the tail. Juveniles look much like the adults, only the yellow areas are sometimes not as pronounced as in the adult. The elongated dorsal fin is evi-

dent in all stages, up to the maximum length of about 10 inches. *Acuminatus* means taper pointed in Latin, and refers to the filamentous fin. □ The false Moorish idol is a common fish, widespread throughout the tropical Indo-Pacific to Africa. It is said to be the most common species of the genus in the aquarium trade. A related species, *Heniochus diphreutes*, is almost identical in appearance, but differs from *H. acuminatus* in having fewer dorsal spines. Also, *H. diphreutes* is restricted to three geographic areas: the Hawaiian Islands, Japan and the Red Sea. ❧

Photo By Carl Roessler • Text By Hillary Hauser

Roessler photographed the fish in 30 feet of water in Ponape. He used a Nikon F with 55 mm micro lens in a Niko-Mar housing and a Bauer E252 strobe. Kodachrome 64 shot at f8, 1/60 second, two feet from subject.



Shoot U/W

This is the second of three articles to help you prepare U/W slide shows. November's article covered A/V (audio/visual) equipment. This month we will concentrate on planning and photographing your show. The January article will tell you how to assemble and present your finished show.

Slides form only one part of a slide show. Two other equally important parts are music and narration. In some cases, the narration may be supplemented or replaced by title slides. While some slide shows have all three parts, many shows have only two parts such as slides and

narration only, or slides and music only.

Slides alone won't hold an audience for long. To prove this to yourself, turn the sound off the next time you are watching an U/W special on television. You will see that the images on the screen—even with the added impact of movement—are no longer as interesting.

THEME OR STORY

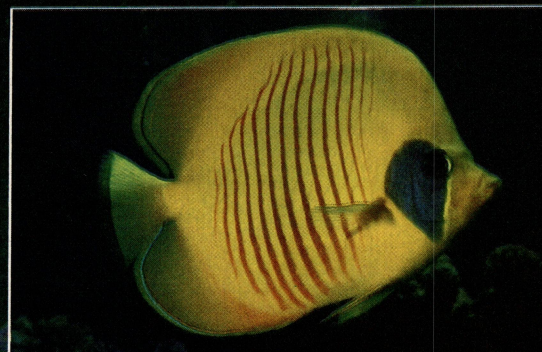
Have a theme or story line. One of the simplest themes is a montage of slides. While each slide or short group of slides is independent, they are usually arranged with as much visual continuity as possi-

ble. Because there is no strong story line to hold the show together, good music is needed to set the mood, pace and to provide a foundation. Because the beauty of each slide is the main strength of a montage, the slides must be excellent!

A travelogue documenting your vacation or dive trip can provide a strong story line. You can begin with topside shots, interject them within the show, and use them for your ending. Thus, from a pragmatic viewpoint, you don't need as many excellent U/W slides as would be required for a montage. The story line, especially if supported by good narration

ing Your Own Slide Show

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH



(1) Left: a long shot should begin the sequence.
(2) Above: a close-up might follow the first slide.



(3) Medium shots can be interspersed in the order.



(4) Additional close-ups can be used as necessary.

and music, can carry your slide show.

Humor—depending on your imagination—has unlimited possibilities. Once your viewers are hooked on the story and are laughing, much of their attention is diverted away from the quality of the individual slides on the screen, especially if they move at a fast pace.

As an example, one of our shows—a story of an U/W photographer attempting to photograph a overly-helpful grouper—contains some of our poorest slides! But, because the audience is so amused by the fast sequences that show the grouper's antics, the old-time title slides and

the humorous background music, they don't examine each slide critically.

If your purpose is to convey information, you may not want background music. Your narration, and possibly title slides, hold the show together. When your purpose is to inform, your slides must be excellent (or the subject rare indeed) if the show is to be successful. Why? Because your narration directs the viewer's eye to each individual slide.

You can develop an idea of your own—something that imparts a philosophical or inspirational message. Cathy, for example, has a slide show entitled The Sea's

Friendly Touch. She reads a poem, written by her and photographer Christy Smith, that relates to her feelings as a diver as the images appear on the screen. The strength of the show is the emotional message; there is no music.

PLANNING THE SHOW

Generally, a slide show should have a beginning, a middle and an end. The beginning can be a sequence of slides that establishes the location and helps set the mood or theme of the show. The middle can consist of several related sequences—usually with about three to sev-

en slides each—that present your purpose. These sequences are actually mini-shows (each with its own beginning, middle and end) joined end to end to form the middle of the total show. The ending sequence resolves or finishes your story.

CREATING SEQUENCES

You can use four basic shots—LS (long shot), MS (medium shot), CU (close-up), and another LS—to complete a simple sequence.

1. Begin with an establishing shot (usually an LS) to set the scene, such as a wide-angle shot of a diver approaching a school of fish.

2. Move in with an MS for a closer view as the fish approach the diver, hoping for some free food.

3. Move in with a CU to show a fish taking food from the diver's hand.

4. End the sequence with a resolving shot (usually an LS) of the diver swimming away.

This basic pattern—LS, MS, CU and LS—can be varied to match the subjects and action. You might, for example, decide to add additional MS and CU shots to lengthen the middle of the sequence. Because lens changes may be required, you may need more than one dive to shoot a sequence.

This same pattern can be applied to close-up sequences. Your establishing LS might be taken with a close-up lens, and your MS and CU shots with extension tubes. In other words, the picture area of an LS, MS or CU can vary with subject size.

You can't always use the same subjects in a sequence. An establishing or resolving shot could be an LS of a diver on a reef—a different diver than shown in your MS and CU shots. In fact, you might shoot some empty scenes that could be used as beginnings or endings for a variety of different sequences. As long as the slides are in a logical order that provides continuity, it often doesn't matter when or where the slides were taken.

CUT-IN & CUT-AWAY SHOTS

A cut-in shot cuts directly into the main action of a sequence. For example, referring back to the four shot fish feeding example above, you could lengthen the sequence by inserting a CU or ECU (extreme close-up) of just the fish's eyes and mouth as it takes a piece of food. Placed between MS and/or CU shots of the feeding, the cut-in strengthens the action.

A cut-away shot cuts away from the main action. For example, an MS of bubbles rising gracefully in midwater can be inserted between slides showing divers with prominent bubble streams. But, be careful with cut-aways. The cut-away

must show a subject or action (such as the bubbles) that the viewer can relate to the main action shown previously.

TRANSITION SHOTS

Transition shots bridge the gaps between sequences. You need a strong transition shot whenever you have an abrupt change in location, subject or action. If changing from cold water diving with wetsuits to warm water diving with swim suits, the transition might require more than one slide and even a title slide. But, if the change from one sequence to another isn't that abrupt, a more subtle transition shot can be used. The resolving shot ending one sequence often serves as the transition to the next.

ACTION SEQUENCES

An U/W photographer at work can provide an interesting, easy-to-shoot action sequence. Shoot an LS of the photographer approaching the area, an MS of the photographer taking a close-up, and finish with an LS of the photographer swimming away. Later, when you arrange these slides in sequence, you can easily insert your subject's close-ups between your shots of the subject to form an LS, MS, CU, CU, CU, LS pattern. The sequence now shows the photographer at work, the pictures taken by the photographer, and ends logically when the photographer is finished and moves on. Again, it may not matter when or where the close-ups were taken.

A simpler variation is to photograph a diver exploring the reef. Photograph the diver looking at various U/W subjects, and alternate these shots with pictures of what the diver is looking at. This gives an MS, CU, MS and CU pattern. If you can dive the site twice, and the U/W subjects are stationary, it might be easier to divide the photography. Photograph the diver first with a wide-angle lens, then go back and photograph the diver's subjects with a normal-angle or close-up lens.

You can also photograph action sequences without changing from LS to MS or CU. If the action is strong—such as a diver battling with a grouper over a goodie bag of food—the humor alone can have more impact than the mechanical techniques of photography.

Shooting for a sequence is different than shooting a single frame for a print. To emphasize a particular action, such as a fish leaving the scene rapidly, break the usual rules of composition—show him half out of the frame and your audience will know he's leaving. Or, if a turtle is swimming away from you, keep taking pictures as it disappears into the distant blue. The last shot would be worthless on its own, but can be an important resolving

shot at the end of your slide sequence.

SHOOTING DISSOLVE SCENES

Let's assume that you have, or may purchase, a dissolve unit. The dissolve unit fades the projected image from one projector onto the screen as it fades the image from the other projector off the screen. This overlapping and blending of images on the screen strengthens continuity because the slide sequences flow with a movie-like quality that you can't attain with a single projector.

You can create beginnings, transitions and endings by dissolving one slide into another. For example, find a scenic view, such as the silhouetted opening of a tunnel or an upward view beneath a kelp forest. Shoot this scene without a diver, and then shoot it again with both a diver swimming into the scene and out of the scene. You can now dissolve the diver into the scene for a beginning, and out of the scene for a transition or ending.

On a boring dive that offers few subjects, look for transition scenes. Take shots of an empty sand bottom, a clear midwater scene, and an upward shot of the texture of the surface. These can be used for dissolving subjects into or out of your show, or for title backgrounds.

When using strobe fill at medium distances, take two shots quickly, one with the strobe flashing and the second before the strobe can recycle. This gives you two pictures of the same subject—one darker with natural light, and one with brighter strobe lighting. In projection, one can be dissolved into the other.

This technique works especially well inside dark areas such as U/W caves and tunnels. Later, when you dissolve the strobe exposure slide over the dark natural light slide, the inside of the cave will appear to slowly light up on the screen. Or, for an ending, dissolve the strobe exposure off and the natural exposure on so the light slowly dims to darkness.

USE DIFFERENT ANGLES

Take several shots of each subject at different camera angles with bracketed exposure settings. Changing angles when you change from LS to MS and CU is a common movie-making technique that can also strengthen slide sequences. In addition, having slides with different views of the subject will be helpful later when you are looking for slides for special dissolves.

PLANNING YOUR SHOTS

You will probably work more efficiently if you plan your U/W photography ahead of time, as follows:

1. Begin with what you have. Lay your slides on a light box and arrange them in-

to natural sequences and groups.

2. Decide what additional slides you need to expand or create sequences. The key idea is not to waste time and film reshooting what you already have.

3. Make simple, stick-figure sketches on 3 x 5 inch cards to represent the slides you need to complete your sequences. If you have several lenses, write LS, MS, CU or ECU on the card, and what lens you will use.

4. If you can dive the same site several times, group your basic shots. Shoot the LS, MS and CU shots on different dives. By shooting wide-angle on one dive, and normal and close-ups on other dives, you can concentrate on one lens at a time.

If, however, you are diving from a tourist boat that anchors at a different site for each dive, you may have to take more than one camera (or both wide-angle and close-up adapters for a Nikonos) with you. The problem with a multi-purpose photo dive is that each lens requires a totally different mental perspective of the subject. Mechanically, the chances of an error usually increase with the square of the number of pieces of equipment and purposes you have.

If you are working with another photographer to jointly produce a slide show, have one take a wide-angle lens and the other a normal or close-up lens. Thus, you can take a greater variety of shots during each dive.

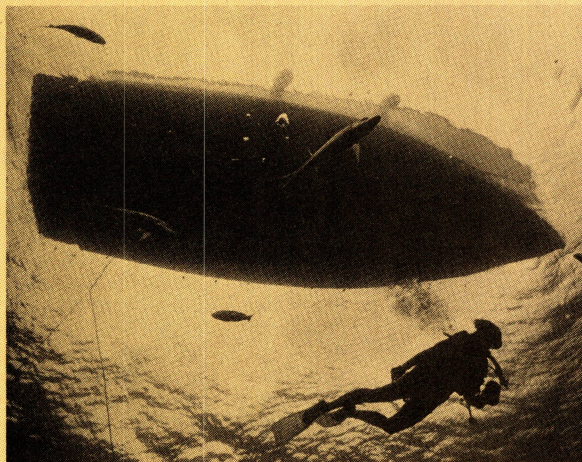
5. Keep your shooting plan for any given photo dive simple. Beginners often try to accomplish too much! While we believe that it is best to stay with your plan, modify or abort the plan if it is unsafe for the prevailing dive conditions.

TITLE SLIDES

Pictures of signs—the name of the island, resort, boat, etc.—can be used for title slides. Move in close so that the words can be read quickly. You don't have to show people in these title slides. One of our creative students took an U/W CU of a hermit crab on a postcard showing a map of the island.

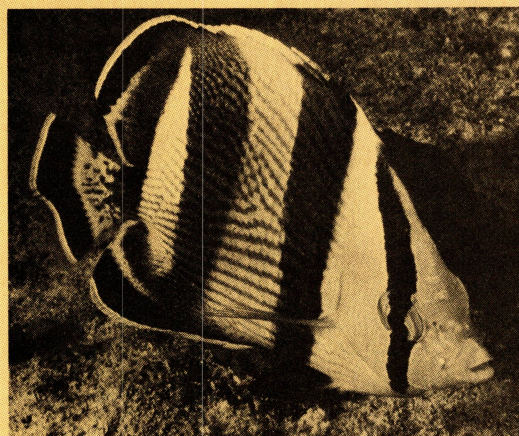
If you have a slide copier, you can create your own title slides by double exposing words over pictures. If you have a close-focusing lens, you can photograph letters on colored paper.

If you don't want to get involved with the mechanics of making title slides yourself, you can buy customized title slides. Prices run from about \$5 and up, depending on the complexity of the slide. For more information, write directly to: Prolab, 4353 6th Avenue, N.W., Seattle, WA 98107; and Stokes Slide Services, P.O. Box 14277, Austin, TX 78761. These companies can create a wide range of special effects. ➤



Once you have these four basic shots, you can add medium shots and close-ups to create a sequence. Left: the establishing shot of the diver swimming from the boat.

The transition shot is of a diver swimming across the reef toward an unseen destination. It implies a change of location. The right to left eye travel makes the transition more obvious if the previous slide moved left to right.



A close-up shot placed abruptly into the sequence is known as a cut-in shot. It takes the viewer right to the main action. A cut-away shot would simply reverse the effect.

A good ending shot signals the viewer that the dive is over. In this case the three divers are heading back to the boat.



Finally! One Toll-Free Number for ALL Your Dive Travel.

Bahamas

Riding Rock Inn

Friendly marine life, good visibility, beautifully preserved reefs and Island Divers have made this one of the most popular Bahama diver destinations. Two hours from Ft. Lauderdale, Riding Rock is a cozy beachfront resort with 24 rooms. The U/W Photo Center is regarded as the finest in the world.

800/526-1394

Bahamas

South Ocean Beach

Located only a few miles outside the hustle and bustle of Nassau on the south shore, this top-rated resort faces Bahamas 4000 meter deep Tongue of the Ocean, with a wall that starts at less than 45 feet. The hotel amenities are superb, including dining, tennis, wind surfing, sailing and championship golf course.

800/526-1394

Bahamas

Walker's Cay

Tops in the Bahamas is Walker's Cay at the northern-most edge of the Bahamas Bank. This 100-acre island, less than one hour from Ft. Lauderdale, is a self-contained divers resort, complete with its own marina, dive center, hotel and customs. The efficient dive operation speeds divers to world renowned coral formations and caverns.

800/526-1394

Bonaire

Habitat

This popular resort captures the mood of Bonaire. Your own private cottage is just steps away from Captain Don's new dive center in front of one of Bonaire's most popular reefs. Complete certification course and U/W photography facility. Good food, good friends and unlimited diving.

800/526-1394

Bonaire

Flamingo Beach Hotel

This 110-room resort hotel, a few minutes from the airport, a short stroll to town is the home of Peter Hughes' DIVE BONAIRE. More than 40 dive sites, plus Bonaire's incredible beach diving. Underwater photo course and developing. Afterwards, relax in the freshwater pool or jacuzzi.

800/526-1394

Cayman

The Grand Caymanian Holiday Inn

Situated in the heart of Seven Mile Beach, this Holiday Inn Resort is the home of Bob Soto's Diving and Water Sports Center. The 215-room resort is the center of Cayman night life, and merely footsteps to your daily dive boat. The Wreck of the Oro Verde rests offshore in just 50 feet of blue ocean water.

800/526-1394

Cayman

Spanish Cove

A Caribbean divers paradise that's in a class by itself is the only way to describe this fabulous resort. Just minutes from George Town and Seven Mile Beach, you are treated to world-class diving on the North Wall. State-of-the-art dive center, photography and instruction make this the best that Cayman has to offer.

800/526-1394

Cayman Brac

Brac Reef Hotel

Now, direct flights from Miami make the Brac's wall diving even more accessible. The Brac Reef is the islands most modern hotel, featuring 30 ocean-front rooms, pool, tennis, sailing and fine restaurant. Winston McDermott's Brac Aquatics offers unlimited diving plus a trip to Little Cayman.

800/526-1394

Cozumel

La Ceiba Beach Hotel

Cozumel's favorite dive hotel and resort, combined with Fantasia Divers, make this the best diving package on the island. Paradise Reef, just offshore, and Palancar Reef, only twenty minutes away offer breathtaking beauty. Beachfront accommodations, pool, unlimited beach diving and choice of restaurant.

800/526-1394

Roatan

Anthony's Key

Virgin blue water from the Gulf-stream trench, two miles deep, is propelled over the 30-mile barrier reef by the constant trade winds, and proves the ideal location for Peter Hughes' DIVE ROATAN. The Tahitian style cottages provide comfort, privacy and delightful view.

800/526-1394

Turks & Caicos

Meridian Club

Your dive vacation is keyed to formal relaxation on the private island of Pine Cay, with beach front suites, freshwater pool, excellent cuisine and impeccable service. The dive operation is personalized and just minutes from shore you'll discover exhilarating drop-offs, blue holes, virgin reefs, caves and canyons.

800/526-1394

Virgin Islands

M/V Tropic Bird

"Maxi Diving with Mini Effort" is how Skin Diver describes this unlimited day and night diving B.V.I. vacation. Considered one of the finest live-aboard dive vessels on the ocean today, the Tropic Bird has double staterooms, A/C, stereo/video, sauna, bar and sun-decks. Explore the islands and dive the Wreck of the Rhone. Weekly departures from Tortola.

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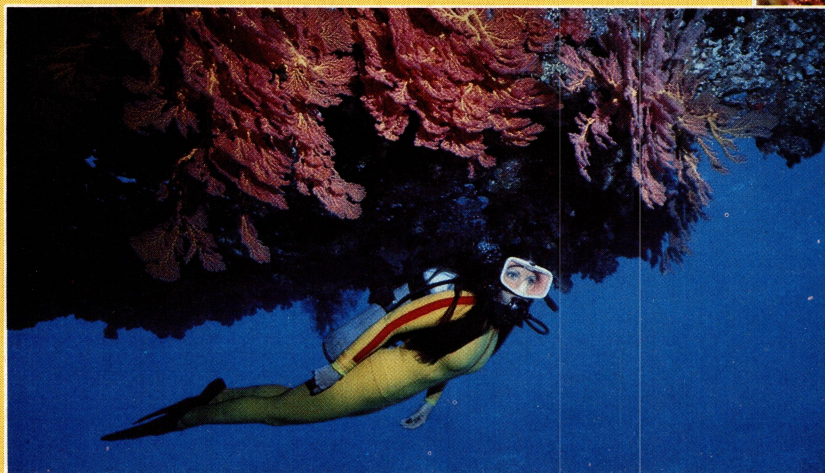
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SDM travel SECTION

FIJI A Private Paradise

Text and photography
by Carl Roessler



Fiji diving is highlighted by Great Astrolabe Reef, 30 miles south of Suva. Here divers will find a vast selection of colorful marine invertebrates and fish as well as steep walls and winding corridors. Exploration of this exciting area is made comfortable and easy on the forty foot vessel, *Sta Reta*, which can be chartered by groups of five or less.

Thirty miles south of Suva in the Fiji Islands lies Great Astrolabe Reef. This paradise of plunging reef walls and scenic islands has no hotels, no dive shops—just diving that makes the heart soar. For years I've heard that some of the greatest diving in the Pacific was at Astrolabe. No less an authority than SDM's Paul Tzimoulis called it the world's greatest reef. The problem was, how to get scuba divers out there to see it.

Enter a charming couple, Eric and Keresi, with a small but ideally-outfitted dive boat. The *Sta Reta* is 40 feet long, but has the interior efficiency of a high-tech mobile home. The airy open salon becomes a comfortable sleeping cabin at bedtime. Yet by day, in the blink of an eye, it can be either

an open sitting room or a comfortable room with a huge table.

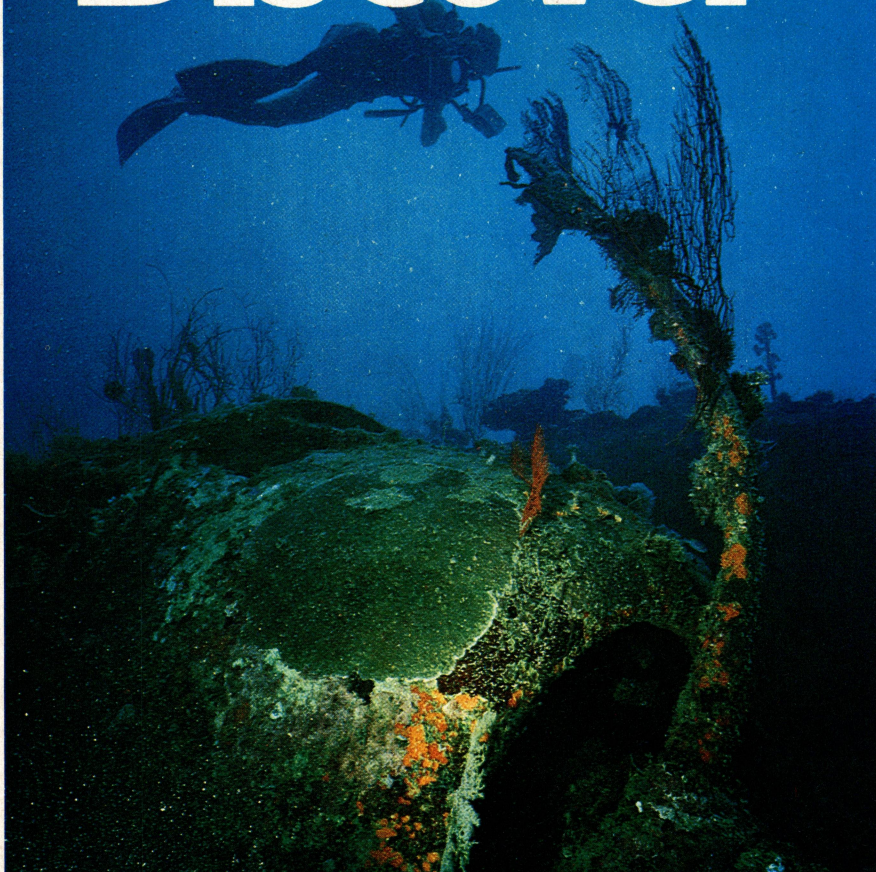
Keresi serves some of the Pacific's most eloquent meals. With a smile, she unveils each meal with a flourish, to the ooh's and aah's of delighted, appreciative divers.

Each evening, Eric brings the *Sta Reta* into a secluded cove for anchorage. After a leisurely breakfast, you cruise out to one of the dozens of dive sites along Astrolabe's ten mile long wall. The parapets of this reef rise to within a few feet of the surface, then plunge straight down. In some areas of North Astrolabe the plunge is to the open ocean floor. In other sites, the wall levels out on a shelf at 150 feet or so, then drops straight down to the oceanic abyss.

The massive reef wall has been fractured and rent by ancient earthquakes. It is now fissured with huge passageway-like corridors. Eric loves to guide divers through the intricate wonderland, pointing out unusual marine life along the way.

My wife, Jessica, and I have made this Astrolabe exploration twice in a year, and can't wait to go again. The food, the diving and the ambience make this one of our special favorites. A couple can charter *Sta Reta* at attractive rates and have Eric and Keresi's service to themselves. For a couple, a family or up to five dive buddies, this exciting new Fiji program is one of the Pacific's best-kept dive secrets. And, the *Sta Reta* can open the door that lets you discover it. 

Discover



In the tropical waters around the mainland and islands of Papua New Guinea you'll discover the wrecks of hundreds of planes, ships and submarines that plunged to the bottom during the war in the Pacific. Many of the world's best divers rate Papua New Guinea as the ultimate in diving adventures. New discoveries of war wrecks are being made by sports divers every year. Plan a diving expedition to Papua New Guinea now.

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PENNEKAMP SPECIALTIES

Al Marques, director of the Underwater Activities Program at the John Pennekamp Coral Reef State Park in Key Largo, Florida, has introduced various specialty courses to the Park's program. Specialties offered through the YMCA are: reef ecology, SLAM (Scuba Life Saving and Accident Management) and scuba first aid. Through PADI, courses are: ocean and reef diver, rescue diver, night diver, deep diver and ecology diver. Underwater photography is the newest course that will be offered, beginning in December.

At Pennekamp, courses are taught in Spanish, French, Portuguese and Italian, as well as English.

Write Al for detailed information, c/o Coral Reef Park Company, Inc., P.O. Box 13-M, Key Largo, Florida 33037.

BAY ISLANDS TOURISM

The efforts of the tourism industry on the Honduras Bay Islands of Roatan, Guanaja and Utila were given a boost recently when the president of Honduras, Dr. Roberto Suazo Cordova, met with two of the islands' most active promoters: Julio Galindo, a former mayor of Roatan, and Peter Hughes. They are the new owners of Anthony's Key Hotel.

President Cordova assured them that his government was backing Honduran tourism development in general, and tourism development in the Bay Islands in particular. Roatan was selected by the Honduran government and the World Bank as a priority development area. A major part of a \$20 million bank loan is being used to finance hotel construction and to improve the airport on the island.

President Cordova expressed his desire to maintain communication with the hoteliers of the Bay Islands and to support them in the type of development that would maintain and protect the islands' unique, unspoiled beauty.

The President expressed concern about the distorted image of Honduras resulting from confusing it with other Central American countries. Galindo and Hughes confirmed that frequently when new acts of violence in neighboring countries are reported by the news media, the islands' hotels get cancellations. They hastened to add that this is not done by the dive shops who know Honduras.

President Cordova assured them his democratically elected government had the full support of the people and Hondurans would never permit violence from other countries to spill over into their country. Presently, he said U.S. travelers to Honduras, and particularly to the Bay Islands, are as secure as at home. He pointed to the close and cordial relationship that exists between Honduras and the United States, and urged North Americans to visit Honduras to experience Honduran hospitality.

project interlock

TEXT AND PHOTOGRAPHY BY WADE DOAK

Before Project Interlock began in 1977, New Zealand diver/dolphin contacts were very brief: just hello/good-bye encounters, with quite a lot of fear on the human side, as people weren't sure what to expect. Since that time we have published two newsletters which outlined the procedures Project Interlock uses to establish friendly rapport when meeting dolphins. Then we put out a diver/dolphin encounter questionnaire and sought written accounts from others.

Now we have bulging files of diver/dolphin interlocks (encounters) that extend right around the New Zealand coastline, involve four different species, and show rapid growth in frequency and quality.

Duration seems to be the only objective way, as yet, to evaluate human/dolphin encounters in the wild. Per a regular, free newsletter circulated to the N.Z. skin diving world, Project Interlock has published ways in which our researchers have tried to be "interesting" to dolphins. These game-play approaches have resulted in a series of complex behavioral exchanges, lasting up to four hours and 20 minutes with *Delphinus*, the common dolphin and two and one-half hours with *Tursiops*, the large bottlenose species. In both these cases interlock had to be terminated from the human end: exhaustion, etc. From many sessions a pattern emerges that suggests noncaptive dolphins avoid repetitious situations such as experimental routines.

Fear seems to be an important factor in cases where dolphin approaches to people and vice versa have been very brief. We suspect that in the past it was this response plus the diver's uncertainty about sharing the ocean with dolphins that led to the typical limited meetings of the past.

For this reason Project Interlock believes that the development of richer human/cetacean relationships can well be furthered through the exchange of experiences per our correspondence.

Our published articles and reports have stimulated a flow of interesting dolphin/diver anecdotes which parallel our own field experiences and lend a degree of objectivity to intensely subjective findings. From the material on hand we can say for certain: reports of interlock with cetaceans are increasing in frequency, quality and species range, and this trend can be expected to continue in the '80's. We have so much to learn.

In so many cases human mimicry of the dolphin kick and other mimetic game-playing (as recommended in our Dolphin Games) seem to have heightened and extended exchanges. Dolphins now mimic *us* mimicking *them*. Just pointing cameras or a plastic pad at dolphins can put a damper on things. It seems creative, spontaneous play should be foremost, if the situation is to develop in complexity and duration.

A huge increase in human/cetacean encounters in New Zealand during the summer of 1980-81 began with a whale. In November, newspapers throughout the country carried a front page story of the friendly meeting between a right whale and fishermen off Kaikoura. Peter Kelliher was shown astride the 45 foot leviathan. And, from that month on, we received the most exciting flow of interlock reports in all our study: 24 reports over five summer months. Not only divers were involved: in December a beach strolling family was approached by four dolphins at Lonely Te Arai Point. The woman called and the dolphins swam around their legs and were stroked. Then, at North Cape, a boatload of marine scientists on a survey were met by dolphins which virtually forced them to abandon their studies and play.

A December yachting family off Whangaroa dangled their legs amid a group of bowriders. Five children were touched on the legs as the dolphins leapt.

Canoeing out from Whangaruru on February 2, Mr. Volkner and his teenage daughter paddled up to some dolphins and sat still. To their delight one dolphin surfaced between their paddles, rose on its tail and looked at them, chattering.

"Go on, pat him," said the father. The girl reached over and patted the huge creature while it just stood, head out of the water, beside the canoe. For one and a half hours the dolphins played racing games with the canoe, cavorting around while other boats assembled in the vicinity. (The dolphins withdrew until they switched their motors off.)

On January 31 four grandparents on a cruising launch snorkel-dived with dolphins at Deepwater Cove in the Bay of Islands. "They really put on a show leaping clear of the water and falling over backwards, as if trying to make the biggest possible splash and scooting along the surface whacking their tails," Murray Pulham told us. "Many times they rolled over

and swam to within six feet of us. We all agree it was one of the most delightful experiences of our lives."

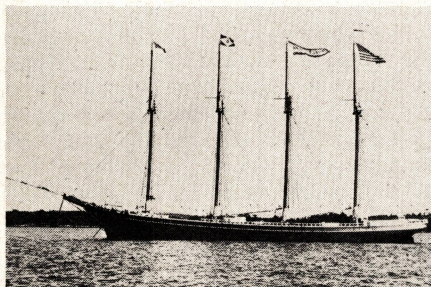
Then, on February 6, dolphins came up to our catamaran, R/V *Interlock*. We had just installed a powerful sound transmission system in our bows. We played the dolphins a piece of classical flute music by a Japanese composer. The whole catamaran was quivering with sound. The dolphin response was cataclysmic—we've never seen such play power, such salvos of high leaping and vigorous, extended, upside down tail slapping. Like big black bananas they embraced our bows with their 12 foot bodies, hugging the vibrating hulls and looking up at us inches away as the catamaran hurtled along downwind. It went on with the intensity of a stock car rally for 30 minutes until we were utterly exhausted emotionally and physically. It is not possible to relate in words the intensity of such encounters on so many levels.

On March 15, Pat Winders, scuba diving for crabs at Moeraki (Otago) found himself sharing a cave with a curious bottlenose which later accompanied his boat all the way to shore. It all started when Pat headed down his anchor line; "Next thing the dolphin was there suspended tail upmost, head nearly on the sand, remaining motionless for several seconds. He did this repeatedly. At one stage I was poking around in a crevice when I had the feeling I was being watched. I looked around to find a dolphin head about two feet from mine, trying to see what I was looking for."

So what has been happening between humans and dolphins? One thing is clear: none of these people imposed themselves on the dolphins. Each episode occurred spontaneously. The dolphins made the choice. Because the humans were unafraid the encounter intensified. But if dolphins or whales are chased, encircled or buzzed by outboards, or in any way harassed, they will simply withdraw. If you are lucky enough to meet friendly dolphins or whales, do please let us know about it. Write: Wade Doak, Director, Project Interlock, Box 20, Whangarei, New Zealand. We especially want to extend our feedback experiments to America. It seems the more people hear about these friendly encounters, the more they happen. Our fears have been the barrier in the past. 

BRIRY FOUND

The Historical Maritime Group of New England reports finding the shipwreck of the four masted schooner *Edward E. Briry*. The schooner was located during an extensive undersea survey program to pinpoint historic shipwrecks in New England waters. The *Edward E. Briry* was 228 feet long with a beam of 43 feet and a draft of 20 feet. She was built in 1896 in Bath, Maine, by the G.G. Deering Company. The 1613 ton vessel was deeply laden with coal and bound from Norfolk,



photo/courtesy Maine Maritime Museum

Virginia, to Portland, Maine, when she sank nine miles off Chatham, Cape Cod on the morning of December 15, 1917, during a severe winter gale.

The group has surveyed hundreds of square miles underwater in New England in search of historic shipwreck sites using sophisticated electronic survey equip-

ment. The primary tool used in the program is a sidescan sonar, manufactured by Klein Associates, Inc., of Salem, New Hampshire. The sonar is an acoustic imaging device which scans large areas of the seabed and assists in locating shipwrecks and other seafloor features. 

PINEAPPLE BEACH

The St. Thomas Diving Club is expanding its dive operation at the Pineapple Beach Resort to coincide with the expansion of the hotel, restaurant and convention facilities. Pineapple Beach Resort, located on the north side of St. Thomas, offers a variety of rooms and activities which include Sunfish sailing, tennis, swimming in freshwater pools and sunbathing on a white sand beach. The restaurant complex includes Polynesian, Italian, and West Indian menus. There is a casual open air bar and restaurant, beachside.

Diana Backus heads the dive operation at the St. Thomas club. Captain Armando Jenik and his 40 foot dive boat, *Goldilocks*, have been relocated. The *Goldilocks* is stationed beachside and picks up divers right at the Pineapple Beach Resort dock. In addition, Pineapple Beach Resort is a short walk from Coki Beach.

Full dive packages are available through: Pineapple Beach Resort, P.O. Box 8267, St. Thomas, USVI 00801. 

LEE/NATURE STUDY CENTER

Owen Lee, writer, film producer and former Cousteau diver, has resumed his duties as founder-director of the Nature Study Center on Las Gatas Beach in Zi-



The Buccaneer

Your elegant oasis of privacy in the Caribbean. A perfect choice for the outdoor enthusiast who is serious about scuba, water sports or golf and tennis.

St. Croix, U.S. Virgin Islands



For the discerning diver

Caribbean Sea Adventures offers Buccaneer guests the largest selection of dive sites on the island. The Buccaneer excels in watersports with CSA leaving from the Buccaneer dock every day.

For reservations and information on dive packages, contact your travel agent or Ralph Locke, 315 East 72nd St., N.Y.C. 10021
Ph: 212-586-3070 Telex 423282
or call Toll Free — 1-800-223-1108



huatanejo, Gro. Mexico. The center is a tropical seaside bungalow and camping complex that offers vacation study seminars to groups of 8 to 20. Scuba diving is included as a means of returning to one's origins in the sea.

For more information contact Owen Lee, Nature Study Center, Apartado Postal 81, Zihuatanejo, Gro. Mexico. 🐠

SANDY BEACH SLASHES RATES

Sandy Beach Watersports, on Barbados, has slashed the rates on its scuba diving packages. Jolly Roger Marine Charters, a subsidiary of Jolly Roger Cruises, now runs the watersport concession at Sandy Beach resort. The new manager is David Farmer, an internationally certified diver and instructor with 15 years experience.

Sandy Beach Watersports can handle up to 20 divers using two dive boats; a 32 foot Lindsay sport fisherman with ship to shore radio and the latest safety equipment, and a 22 foot pirogue.

Scuba reservations are available from Sandy Beach. Group inquiries should be mailed to: Sales Manager, Sandy Beach, Worthing, Christ Church, Barbados.

Knightbridge Marketing Services, Inc. handles hotel reservations for Sandy Beach in the U.S. and Canada. The company is at 1661 Worcester Rd., Framingham, MA 01701. 🐠

SOUTHERN CROSS CLUB

The Southern Cross Club recently reopened on Little Cayman as an all-around sportsman's lodge managed by Mike and Donna Emanuel, who have seven years' travel experience in the sister islands. The club can accommodate up to 20 guests, and has complete dive facilities for up to 10 divers.

Beach cottages feature comfortable rooms with either single or double beds and with a private bath adjoining each room. Native Caymanian cooking is served family-style in the clubhouse, and features a variety of local seafood. A completely stocked bar and comfortable recreation area also are available for guests.

Sportsmen's packages for fishermen and divers are available upon request from (318) 222-0517 or P.O. Box 2, Shreveport, LA 71161. 🐠

PESO DIVES

The peso devaluation has made an even better deal for those wishing to enjoy the excitement and hospitality Mexico offers.

Divers Unlimited of Hollywood, Florida continues to offer dive vacations to Cozumel with accommodations at La Ceiba and Sol Caribe hotels. The many restaurants and night spots offer friendly service at reasonable prices.

For information call Jo at Divers Unlimited, toll free at (800) 327-2740. 🐠

THE DIVE SHOP/COZUMEL

John O'Hanlon, director of training at The Dive Shop, Inc. in St. Louis, will lead a group to Cozumel, Mexico to dive with Fantasia Divers. Trip dates are February 14-21. Space is limited to 20 divers.

For more information contact John O'Hanlon, c/o The Dive Shop, Inc., 9832 Manchester Road, St. Louis, Missouri 63119. 🐠

CALYPSO DIVERS

Calypso Divers Ltd., on Grand Cayman, now offers daily one and two tank dives and snorkeling trips to all sides of the island.

Dave Miller is the owner and dive-master. Calypso Divers has both a 25 foot flattop and a 25 foot V-hull to serve certified scuba divers. Morning, afternoon and night dives are offered daily, and special group charters can be arranged in advance.

For information and reservations contact: Calypso Divers Ltd., 1604 Royal Mile Dr., Arlington, TX 76015. 🐠

CAYMAN PHOTO SEMINARS

Stephen Frink has selected Spanish Cove Resort on Grand Cayman as the site for three underwater photography seminars in 1983.

Dates are March 19-25, May 21-27, and June 11-17. For further information write Stephen Frink Photographic, P.O. Box 1907, Key Largo, FL 33037. 🐠

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ANTHONY'S KEY COMPRESSOR

Anthony's Key Resort on the island of Roatan has acquired the largest air compressor/storage system in the western Caribbean. Dubbed "Lazy Elmo" with obvious reference to "Easy Elmo," a similar system in operation at the Flamingo Beach Hotel on Bonaire, the new system features a five stage Davey compressor driven by a 83 hp John Deere diesel with a 20 kw generator.

Lazy Elmo will pump 50 cfm at 3500 psi and shares common plumbing with two back-up compressors and a storage system that provides Anthony's Key with 20,000 cubic feet of air on hand.

The new system was custom built and installed by Unlimited Pressures of Hialeah, Florida. According to company President Carl Morin, Lazy Elmo took over 300 man hours to assemble. In addition, the dive operation features a fleet of 40 foot custom dive boats and new diving and rental equipment.

CALLOWAY PROMOTED

Virgin Islands Diving Schools, in St. Thomas USVI, has promoted Hugh H. Calloway to assistant manager.

Originally from Hazel Park, Michigan Hugh has been with Virgin Islands Diving Schools since June of 1981 and holds instructor ratings from PADI, NAUI, SSI and YMCA, as well as CPR, first aid, and water safety instructor qualifications from the American Red Cross.

Virgin Islands Diving Schools offers all levels of tours and classes. For further information, write: Virgin Islands Diving Schools, P.O. Box 9707, Charlotte Amalie, St. Thomas, USVI 00801.

HELIX TO PHILIPPINES

Helix Limited of Chicago, IL has scheduled its 1983 photo/dive trip to the Philippines for February 19-March 9. The trip includes eight days and seven nights aboard the 120 foot *Lady of the Sea*, cruising the dive spots of the South China Sea. Also included are three days of resort diving at Dive 7000 in Batangas.

The package price includes: 10 days of diving in the South China Sea with three to six dives a day; a 14 course Chinese feast in Manila; all meals on the *Lady of the Sea* and at the resort in Batangas; hotel rooms in Manila and Hong Kong (double occupancy); transportation to and from hotels and boats; photographic instruction; a set of 30 slides documenting the trip; and special rental rate on Nikonos cameras and Helix flash units.

For further information contact: Paul Schutt, Helix, 325 West Huron, Chicago, IL 60610.

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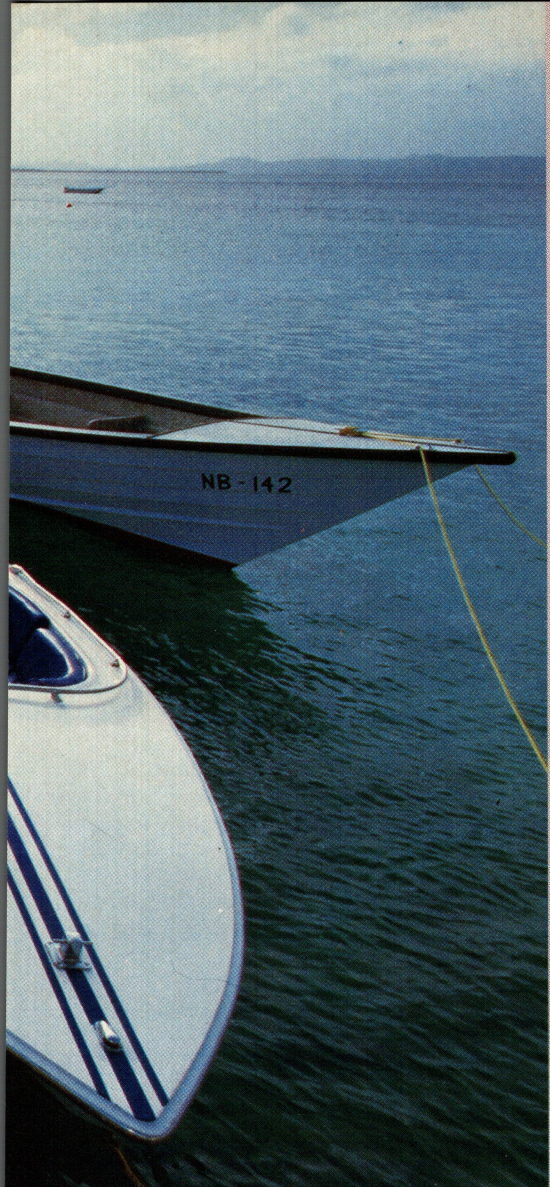
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Top: Peter and Alice Hughes, owners of Dive Bonaire. Above: Dive Bonaire's flattop *Moonshadow*. Right: An aerial view of the Flamingo Beach Hotel, headquarters for Dive Bonaire.



Pool at the Flamingo Beach Hotel. The hotel and Dive Bonaire combine to offer the visitor full service and comfortable accommodations with the security of a large operation.

DIVE BONAIRE

A Cinderella Success Story

TEXT AND PHOTOGRAPHY BY RICK FREHSEE

I had met them nearly ten years ago, before they were married and when there was more time for play. Their story begins, almost like a good movie, on the lush jungle island of Roatan where he was a budding dive operations manager and she was an art student on vacation from college.

He was scruffier then, his hair and beard were longer; he was less disciplined. She was more naive, more innocent and knew nothing about his world except for scuba lessons she had recently completed back in Kansas. They met and, as they say, the chemistry was right. They fell in love.

It became a long distance love affair with both of them running back and forth between Kansas and the Caribbean. She was working toward a master's degree in art and a teaching career. There was an old boyfriend with more conventional pursuits. The tug-of-war of hearts and minds ceased with their marriage in 1975.

Afterward he wisked her away to the beginning of their career. At first there was a brief stint as the vice president of a now defunct dive travel firm. And, then they were in Bonaire, just the two of them, very much alone.

Today, over five years later Peter and Alice Hughes own an operation that hosts 5000 divers a year. Dive Bonaire, at the Flamingo Beach Hotel, has seven boats—four flattops, two mono-hulls, and a small search ves-

sel. There are 22 employees—managers, mechanics, technicians and dive-masters working seven days a week. There are 150 tanks on hand and an air system that pumps 100 cubic feet per minute.

With two homes on Bonaire and a condominium in Miami, their empire also reaches across the Caribbean to Anthony's Key Resort on the island of Roatan. The Hughes have moved full circle now—returning to Anthony's Key where they met and where Peter first worked as a divemaster, to take over the setting up of that dive operation. In Hughes style, within one year, practically everything has been renovated or replaced with state-of-the-art equipment. As Peter says with a sly grin and in his best Scottish/Antillian brogue, "If it's not the very best we won't float it, boat it, or tote it."

Peter Hughes may be the perfect dive operation entrepreneur. He is a Scotsman who first learned to dive on the island of Tobago where he worked as a counselor for a summer scuba school. Still on Tobago, he went to work for Texaco as an oil field production engineer. Here he received hands-on training as a general mechanic and with welding, compressors, instrumentation, machinery and diesel and gas engines. It was this kind of training, where he had to fix things on-site, that he credits with his survival during lean years when it was

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Paul Tzimoulis, Editor, Skin Diver Magazine

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DIVE BONAIRE

just he and Alice on the job. After Roatan and over the years on Bonaire, he has matured, become more polished and definitely more aware of his role and potential in the industry.

It is, however, the exceptional chemistry of Peter and Alice that has provided total success. They not only complement one another, they are, together, more than the sum of their parts.

We asked the owners of what is probably the largest single dive operation in the Caribbean about their personal development and about the secrets of their success. Here's what they had to say:

SDM: You two are considered to be a model of success—two young adults who have built one of the most successful and popular dive businesses in the Caribbean. How did you do it?

Hughes: First of all, we were at the right place at the right time. Don [Stewart] put Bonaire on the map but it wasn't going anywhere for one reason or another. Then tourism began to recognize its natural resources; the airlines opened up new routes, and the hotels expanded. Our hotel (Flamingo Beach) went from a 30 room POW camp to a beach club and then to a 110 room luxury resort. During this time we were all pushing each other, criticizing each other to make sure that each did his share. Interests on Bonaire work together better than most anywhere else—an example is our excellent mooring system which is shared and sponsored by all the dive operators and the government.

Secondly, we have an excellent relationship with our resort. The owners of Flamingo Beach and Dive Bonaire have joint efforts in advertising and promotion and marketing. We have a joint reservations system—the best in the business.

Third, as the business has grown it has been increasingly necessary to learn to trust our staff. We have excellent management. Dive operations manager Craig Burns is the best in the business. And, that goes for all our employees—all 22 of them. As long as they continue to perform their duties in the company's best interest and I can rely on their continuing loyalty and efforts, we can maintain the growth rate of the last couple of years.

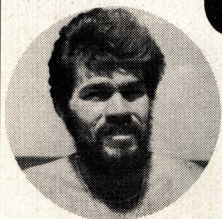
SDM: Tell us about Alice's role in the Dive Bonaire organization.

Hughes: I wouldn't buy a \$200 wetsuit or a \$50,000 compressor without her OK. The dive operations business is traditionally thought to be male dominated. Alice is an example of a female who has proved that this is not so. She was three short hours from a master's degree when I dragged her off to the Caribbean to fill tanks, run compressors, paint decks,

(Continued on Page 86)

PETER HUGHES'

DIVE BONAIRE

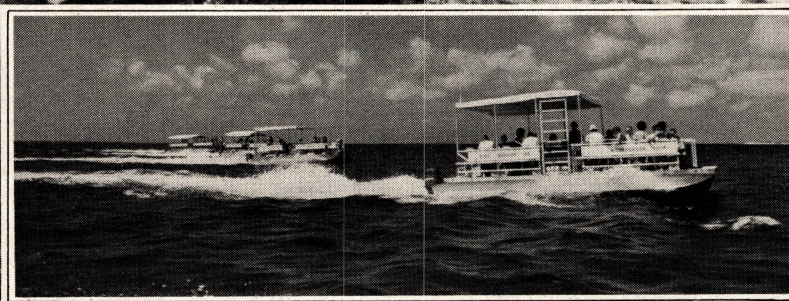


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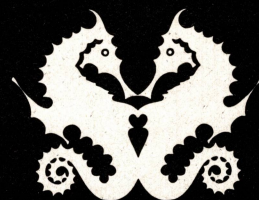
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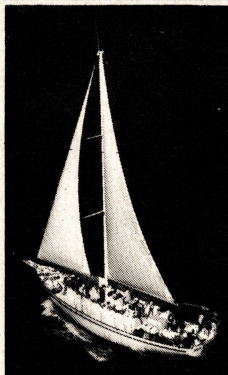
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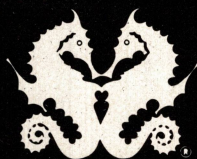
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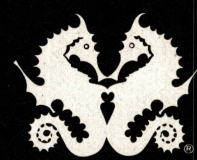
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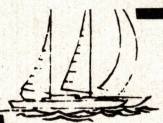


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DIVE BONAIRE

(Continued from Page 82)

scrape boat bottoms, etc. This she did, and more, without once compromising her femininity. Although she has remained slim and sexy she is exceptionally strong—capable of rescuing a man twice her weight. With the exception of heavy maintenance and repair work, she has done everything else in the business. Today she runs the total business for months at a time in my absence. Her brilliant business sense and ability are best spent with the correspondence, purchasing and keeping a close eye on the money flow.

SDM: Some might say that you are too successful—that Dive Bonaire has perhaps gotten too big. What do you have to say to that?

Hughes: A dive operation is a business. It may be a lovely, even glamorous business in the eyes of some, but in the end result it is a business and the same theories of good business practice that apply to construction or oil drilling must apply to a recreational dive operation. You must have money not only to survive, but in order to grow and be a leader. Some people do not understand that you must be big to serve the individual diver. Our operation could not afford to have the largest fleet of boats in the Caribbean with 12 customers a week. We could not afford to have a quarter million dollar payroll or the largest air system in the Caribbean without volume business. In over five years of service, we have not missed a single day of diving. It is only when an operation gets crowded or impersonal that there can be a problem. We try hard to be neither.

SDM: What special things do you do for the individual diver?

Hughes: Most special is the unequalled guarantee of reliability. We go everyday, safely and on time. A diver knows when he goes, and where he goes. He doesn't have to wonder. Each day he has 10 to 12 dive sites to choose from depending on what boat is selected. There are night dives every night of the week except Saturday and a choice of unlimited shore diving.

I consider my reef guides to be a special service to my clients. They are there to assist when needed, particularly when requested. However, qualified divers are free to swim in the opposite direction of the reef guides if they so desire, within the recognized limits of safe sport diving. There are a maximum of 16 divers on a boat. It is possible for a buddy team to complete the whole dive without seeing anyone else on the bottom. We don't run a hand-hold operation. On the other hand, we teach introductory resort courses to 600 people a year. These

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people are segregated from the rest of the divers and have direct instructor guides. We have never had an accident under these circumstances.

SDM: What do you require of each individual diver?

Hughes: All we ask is that each diver has a buddy, a timepiece, a depth gauge, a BC and a submersible pressure gauge. Of course, he/she must have a certification card and sign a release form. We also insist on no decompression diving. There is no recompression facility on Bonaire. Curacao has an excellent chamber but there is no Coast Guard available. A bends victim would have to be transferred via private charter aircraft.

SDM: What can the individual diver do to better prepare for a dive vacation?

Hughes: Divers need to prepare their equipment better, make sure that the mechanics of their regulators, etc. have been checked out by a local expert. Secondly, they need to become familiar with any new piece of equipment in a swimming pool or a lake before they come down here and jump in the ocean. Next, they need to be better physically prepared—this will prevent fatigue and cramping, especially during the first couple of days. Finally, they can answer questions for themselves and be better educated about Bonaire and our facilities by re-reading recent issues of SKIN DIVER Magazine.

SDM: What else can a diver do to ensure a carefree vacation?

Hughes: Most divers are booking with a dive store group or with a travel agency for divers, which is good because everything is included under one package price. Everything is set up in advance, all the diver has to do is check in. Airlines and ground transportation are included as well. But, one step is often forgotten, and this is an important step: The individual should receive and carry a written confirmation of everything he is expecting before departure.

SDM: What could dive manufacturers do to make travel more convenient?

Hughes: Make equipment smaller and lighter within the limits of technology and price. Assist overseas dive operators with a better supply of parts and services to better care for our customers' equipment away from home.

SDM: What's new at Dive Bonaire? What's in the future?

Hughes: We are trying to increase diver awareness by hosting or developing diver education programs. Photo Bonaire, under the management of Chris McLaughlin, is a step in the right direction. So is your photo course [Rick Frésee School of Underwater Photography] four times a year. We are also hosting many seminars for doctors such as HUB Medical Seminars, Inc., Dive Med International and Sea Space Symposium. Craig Burns is putting together an experi-

(Continued on Page 97)

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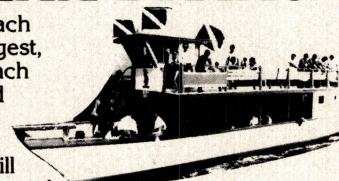
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A large underwater photograph of a female diver with dark curly hair, wearing a diving mask and a green swimsuit. She is holding a large, branching sea fan that is completely encrusted with yellow fire coral. The background is a deep blue ocean with some light filtering through the water.

HAITI

Above: A huge seafan, completely encrusted with fire coral. Right: A gigantic elephant ear sponge at Amani y les Bains.



Perhaps more than any other Caribbean destination, Haiti exerts a mysterious, romantic flavor and a strange harmony of contrasts both in its land and in its people. This fascination continues below the sea, where much of the diving is characterized by vivid, highly individual subject matter in unusual surroundings.

Haiti is not an island, it is a country; the first Black republic in the new world, which occupies the western third of the island of Hispaniola, the third largest island in the Caribbean. The eastern two thirds of Hispaniola is the Dominican Republic which shares little in history, culture, or politics with its neighbor.

Like the yawning mouth of a crocodile, Haiti lies with its upper lip in the Atlantic and its lower jaw in the Caribbean, snapping at the giant island of Cuba only 50 miles away. Suspended between the croc's jaws is the sizable and unique island of Gonave. It is larger than Cozumel or Cayman and offers a lifetime of interesting diving. Where the jaws come together is the capital and largest city in Haiti, Port-au-Prince.

Port-au-Prince is a sprawling, dusty city filled with commercial chaos and a concentration of what the guidebooks

foliage and knitted together by pebble walkways. The Kaliko Beach Club achieves that nice middle of the road position of providing good food and accommodations without being too fancy. The rooms are spacious and air-conditioned and the grounds are attractive and well kept. There is horseback riding, tennis and excursions to nearby sites.

All watersports, which include scuba, snorkeling, boardsailing, sailing and jet-skiing are the domain of Baskin-in-the-Sun, personified by Alan Baskin and Eva Cope, a couple who have shared their life's adventure in the Caribbean for more than ten years. Alan is a cross between a 1960's hippie, your next door neighbor, and a business executive. Sporting a

15 complete sets of rental gear with aluminum tanks and modern BC's, which are included in the small group package price. Baskin's dive boats are a 28 foot twin diesel cruiser, the *Narcosis*, complete with carpet, benches, platform and fold down ladders (ten divers) and a 21 foot fiberglass V-hull outboard with 85 hp outboard (six divers) and a 16 foot Zodiac MKIV with 55 hp outboard (six divers). A 50 foot twin-hulled catamaran motor sailer can be chartered for larger groups of divers.

Although it can handle large groups, the forte of this operation is the personal relationship, warmth and fun that is developed with small groups of divers.

Dive sites accessible to Kaliko Beach

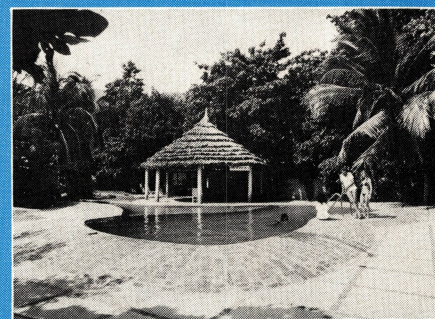
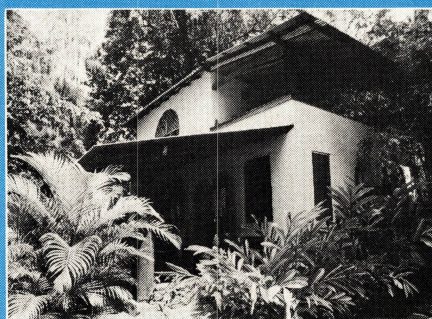
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TEXT AND PHOTOGRAPHY
BY RICK FREHSEE

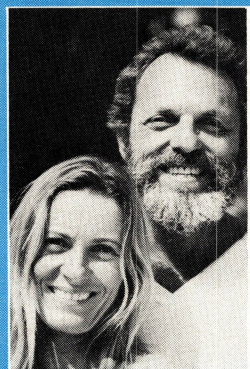
say is 500,000 people (actually closer to a million). It is filled with such contrasts as a modern jet airport, the capitol and governmental palaces, luxurious hotels and restaurants—and a huge indoor/outdoor market with a concentration of salesmen, beggars and survivors living in slum conditions the scope of which will rival anything in the Caribbean.

Fortunately, it is fairly easy for a diver to see at least some parts of this exotic country on the road to the north or south of Port-au-Prince. The better diving and the only dive operations are one or more hours away in either direction.

A little more than an hour north of Port-au-Prince (42 miles or 64 km) is the Kaliko Beach Club, home of the Baskin-in-the-Sun dive operation. Kaliko (pronounced Kah-lee'-ko or Kal'yko) is a village of round concrete cottages capped with peaked thatched roofs, right on the shore of the Gulf of Gonave. The village is complete with reception center, main dining room and entertainment center, outdoor lounge and breakfast/lunch restaurant, lagoon-shaped pool and watersports center—all surrounded by tropical



Above: the hospitality center at the Cormier Plage Hotel (left), and the pool at the Kaliko Beach Club. Below left: Alan Baskin and Eva Cope, co-owners of Baskin-in-the-Sun. Below right, left to right: Jean Claude Dicquemare, Jerry and Jane Barnes.



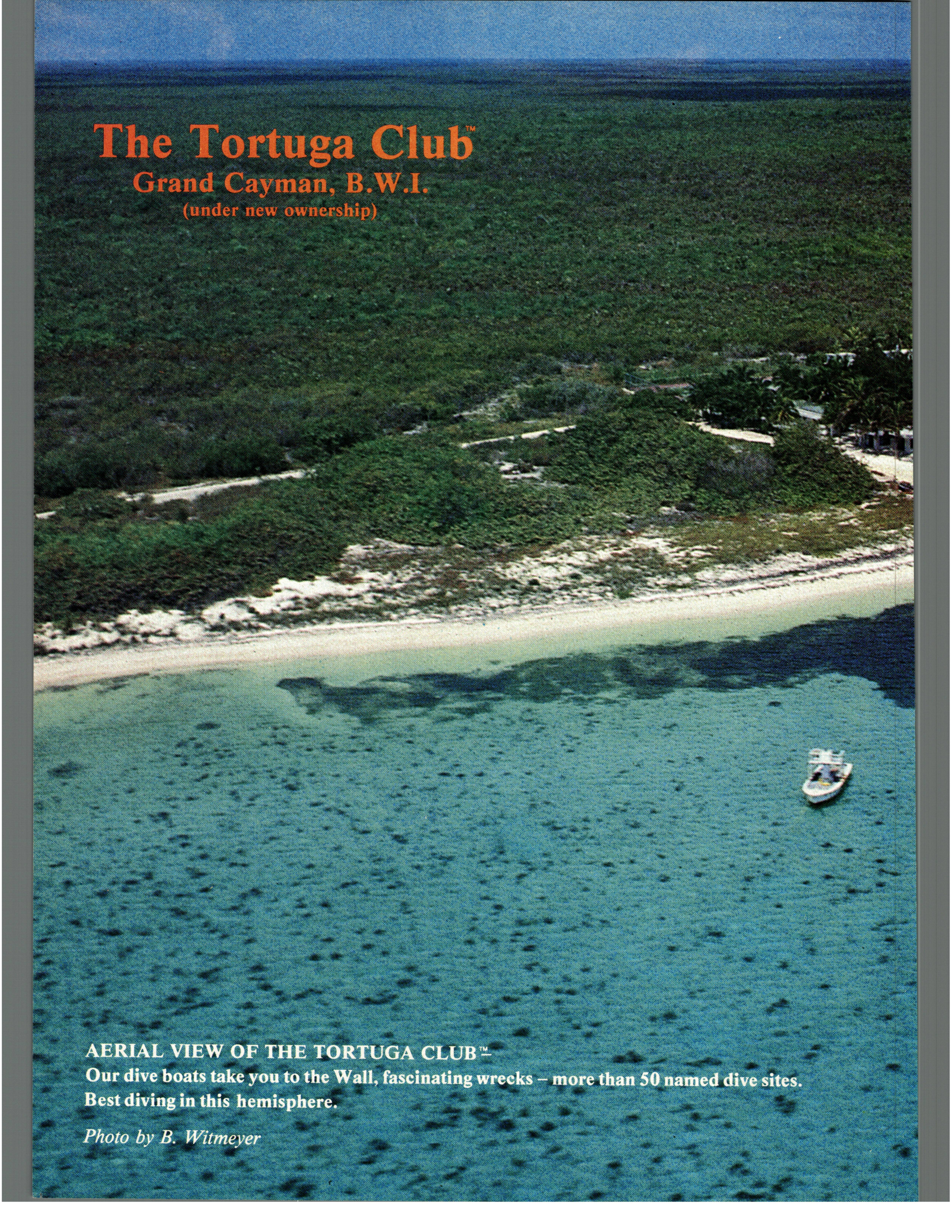
salt-and-pepper beard and dressed like a guru, he is a cat with many lives who has been a film and TV producer, campaign manager, airline executive and baby food entrepreneur. Eva is a pretty blonde with an affinity to the Caribbean lifestyle and an equal share in the problems and the successes of the business. Together they are happy and make everybody around them happy in the process.

Baskin-in-the-Sun and Kaliko Beach can handle singles, doubles, small groups and, with some notice and preparation, get cranked up to handle groups of 60-90 divers—as they did recently in hosting a HUB (Human Underwater Biology) medical program. The Dive Center pumps air with a large 816 Worthington 20 cfm and a back-up H-15 Mako 90 cfm with 4000 cubic feet of storage. There are

are all in the Gulf of Gonave and run the gamut from standard Caribbean reef diving to sites which feature some of the most fascinating individual dive subjects in the northern Caribbean.

Five to seven minutes away from the dive shop dock is Surprise Reef, with large coral heads lying at depths down to 65 feet. The heads rise to within 30 feet of the surface at several points and there is a still deeper section out in 80 feet of water. The area is characterized by wide deepwater fans, large and delicate appearing azure vase sponges and an assortment of colorful tube and orange elephant ear sponges. Our visibility was about 60 feet.

Even closer to the resort (three and one-half minutes by Zodiac) is Jamie's
(Continued on Page 93)

An aerial photograph of a tropical coastline. The top half of the image shows a dense, green forested area. A narrow strip of white sand beach runs horizontally across the middle. Below the beach, the water is a clear, vibrant blue, revealing a sandy bottom with some darker patches. A small white boat with a blue stripe is visible in the lower right quadrant of the water. The sky is a clear, pale blue at the very top.

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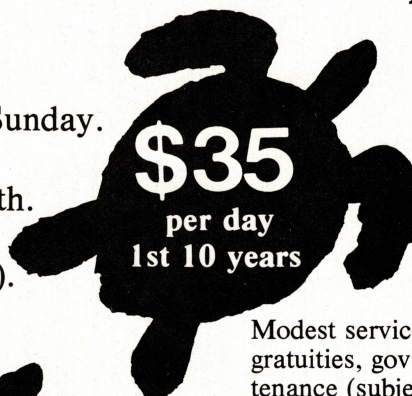
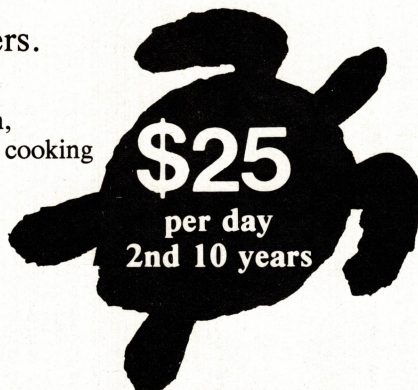
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HAITI

(Continued from Page 89)

Reef, which is Baskin's resort course location and primary shallow reef site. Although slated for neophyte divers, this spot shouldn't be missed, if only for the nice coral formations and scattered heads alternating with rivers of sand and huge swaying seafans. Oddly, this site had 80 foot visibility even though it is closer to shore.

For really exotic shallow diving try a variety of sites located around the Arcadins, a group of low scrub islets about 25 minutes from Kaliko, surrounded by prolific patches and fringes of golden corals. The reefs here are often described as similar to the shallow reefs in the Red Sea. There are at least a half dozen individual dive sites at the Arcadins, all within 35-45 feet, which gives you lots of bottom time to view what we considered to be the prettiest shallow reef diving during our Haiti trip. At Amani y les Bains (just say Ah-mah-nee) there are a couple of mind blowers to consider. First there is the closest, most precipitous drop-off I have seen anywhere in the Caribbean and second, something that is billed as the world's largest sponge.

Amani Beach is a shore dive 20 minutes north of Kaliko Beach via the Baskin

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Tourmaster Associates
100 Caldwell Drive
Oakridge, TN 37830
(615) 482-1645

George Kenn
Restaurant La Lanterne
41 Rve Borno
Petionville, Haiti
Phone: 7-0479

dive van. From the highway to the shore is a kidney-jarring five minute ride over a rugged dirt road to a deserted resort headquarters and a small restaurant which is open for lunch only on weekends. The covered patio is a perfect staging area and here, as everywhere in Haiti, you do not lift a finger to carry your gear

until you are ready to slip in the water.

The shoreline is a pretty crescent shaped white sand beach with a rocky wall at the northern end. If you enter at the beach and turn north along the shore there is a section only 15 feet away in water only four feet deep, that drops vertically to hundreds, maybe thousands of feet. It is almost incomprehensible.

Besides the dramatic topography, there are other attractions at Amani. There are beautiful schools of creole wrasse and lots of macro critters. Splendid eagle rays often glide along the wall.

At Zombies' Hole is a huge crater-like formation cut into the shoreline a short distance north of the beach. It is a sheer wall, often undercut in places, known as the Hanging Gardens. Here is an unforgettable conglomeration of sponges in reds, oranges, yellows and purples.

Sponges are king in Haiti and the king of sponges is found at Amani at a depth of 110-125 feet. The WLS (World's Largest Sponge, as it is called) may not have any rivals. While I took photographs, diver Jeanette Holmes hovered over the sponge and held on gently to give it a true size relationship. Later we measured just to be sure. The Amani elephant ear is 13.5 feet tall and eight feet wide.

Cap-Haitien, and our next dive resort, Cormier Plage, is 150 miles from Port-au-Prince on the north coast of Haiti, and every bit worth the three and one-half hour trip. Historically, Cap-Haitien is one of the

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HAITI

richest areas in the Americas. Here, on Christmas Eve 1492, Columbus' flagship, *Santa Maria*, ran aground and was wrecked. It was here too that Napoleon's troops landed in 1802 to fulfill the emperor's wishes of recapturing the island. Many battles were fought and finally on November 18, 1803 the last battle was won. Cap-Haitien is now a sleepy tropical town of picturesque charm.

Cormier Plage is a 35 room beach resort that features diving, relaxation and dining with a definite French accent. The resort has been open for eight years and managed by owners Kathy and Jean Claude Dicquemare. The grounds are tropical and attractive with a setting on one of the best beaches on the north coast. There is a tennis court, boardsailing, fishing, picnics and beach excursions besides diving. The atmosphere is of peace and solitude.

Jean Claude, who often wears a T-shirt with his picture on it that proclaims, "The Last Buccaneer," is a genuine Caribbean personality. Of French parentage, he grew up in Vietnam, met his wife Kathy on the tennis courts of France, and then with his wife, parrots, dogs and sword collection began the development of this resort. Kathy, not so incidentally, oversees the food preparation, which is an unending parade of international, French and Haitian creole delicacies.

Jane and Jerry Barnes are a young married couple who bailed out of New York to begin a new career in the Caribbean. Jerry, a former 3M salesman and Jane, a professional music producer for RCA, came to Haiti, after a short developmental period in Grand Cayman, to become the co-divemasters for Cormier Plage. They are a very fun loving and intelligent couple whose direction and companionship made our stay in Cap-Haitien a particularly nice experience.

Cormier Divers has 30 aluminum 80 tanks and ten full sets of rental gear, which is included in their eight day/seven night package. The boats are a 20 foot Robalo with a 140 hp main outboard and small spare, and a 17 foot Whaler. This operation hosts eight divers maximum, allowing a small intimate group of friends a very fine holiday on a personal basis.

Jane and Jerry have an interesting repertoire of dive sites within reach of Cormier Plage. There are several shallow sites almost in front of the resort and some in a protected cave minutes to the west that are perfect for resort courses and second tank dives. Fifteen minutes east of Cormier are a number of shipwreck sites, some historical and some intact, which invite inspection. And, on the outside is a barrier reef which stretches from the northwest-

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For complete information on Haiti write the Haiti Government Tourist Bureau at 1270 Avenue of the Americas, New York, New York, 10020 or call (212) 757-3517. For complete information on diving in Haiti contact a member of the Associated Dive Operators of Haiti listed at right. Immerse yourself in Haiti for a truly unique vacation experience.

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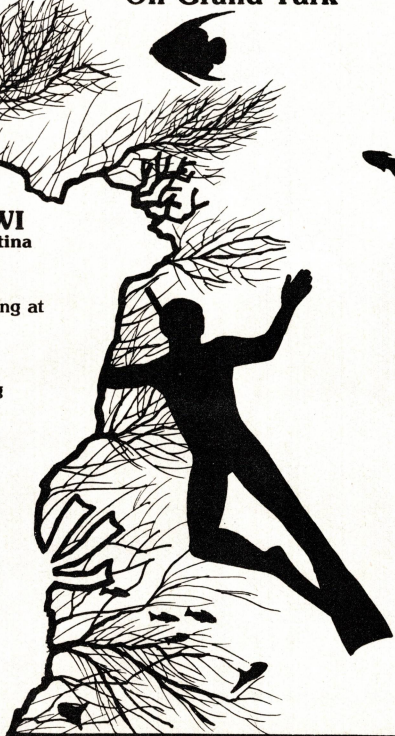
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HAITI

ern tip of Haiti across to the Dominican Republic, offering literally miles of unexplored wall diving. A very small percentage of this outside area has been explored by divers.

Goatfish Reef is at 70 feet and named for the schooling fish there. Finger channels and coral heads loaded with crabs, lobsters, angelfish and snapper are also found here. The *Trolla* is a wreck diver's dream—a 300 foot long Norwegian freighter sunk in Cap-Haitien harbor around 1962. There are two huge bronze props and the superstructure is mostly intact. Of considerable historical interest is the wreck of the *Bulldog*. It lies at the entrance to Cap-Haitien harbor. This was an old world sailing ship that went down in 1865 during a British skirmish with the Haitians. Above the wreck site, climbing the northern hillside, is Fort Picolet with cannons pointing seaward.

If seas are calm, wall divers will appreciate the one hour trip to a site called Fuji Wall. Fuji is a vertical drop through a forest of deepwater fans, black coral and an amazing assortment of colorful sponges of odd shapes and designs. Close to Fuji is a special dive called The Crack, a boulder away from the outside wall, with crevices and tunnels dripping with black coral, deepwater fans and sponges of all description. The Cormier dive schedule allows for a two tank dive in the morning with an optional third dive in the pm. In addition, night dives can be arranged.

The latest in dive operations in Haiti is perhaps the most unusual. Not officially underway until January of 1983 is the unique offer of M. George Kenn de Balintazy. Along the southern jaw of Haiti, in a place called Cap d'Estrees (Cap Des-tray), named after a famous French family of colonial days, is a private villa built five years ago by George. This is the same gentleman who, with his wife Edwige, owns and manages the prestigious and exclusive restaurant, La Lanterne in Port-au-Prince—and that's where your adventure begins.

Guests arrive on Thursday evening at the Duvalier jetport in Port-au-Prince where they will be picked up and taken to La Lanterne restaurant for a welcome dinner *a la carte* with cocktails and wine. After dinner they will be driven to Cap d'Estree. The next four days will be spent diving tunnels, walls, caves, wrecks and black coral forests from there to Gonave Island. The equipment includes 80 cubic foot aluminum tanks and divers will be sped to the reef in a 21 foot Mako with a 235 hp outboard, and a 16 foot Zodiac with a 40 hp outboard.

At the villa, which is on two and one-half acres of land with 750 feet of beachfront, exquisite meals will be served and

dive movies shown nightly. During the stay, guests will be offered a dinner at the nearby Taino Beach Resort, one of Haiti's finest. Tuesday morning they will be brought to the airport for their flight home. Only four to six guests will be accepted at a time and the package includes dives, drinks, all tips and ground transportation. The package is designed for a few privileged divers who would appreciate privacy and highly personalized service. Interested parties should inquire in writing well in advance of their proposed visit.



Air Florida flies 737's to Haiti from Miami seven days a week. For more information on Haitian dive resorts see the sidebar accompanying this article.

DIVE BONAIRE

(Continued from Page 87)

mental deep diving and an environmental program. A new mono-hull craft, the *Solar Rainbow*, has just been purchased and both our mono-hulls will be used to travel further and faster to the less frequented dive sites. This will be especially appealing to returning guests who have visited us for a number of years.

SDM: Describe your new operation at Anthony's Key, Roatan. How does it compare with Dive Bonaire?

Hughes: It is very well equipped and everything is in good working order. We have a fleet of three 40 foot boats and an air system comparable to Dive Bonaire. The staff is experienced, well trained and appreciates its responsibility to visitors. The principle goal is to achieve maximum pleasure with minimum effort on the part of the diver. The reefs are excellent—ranking among the best in the Caribbean. The marine life is not as prolific but the topography is more dramatic. The drop-offs are steeper and deeper. Roatan is a very lush tropical island far removed from the beaten path. The hotel does not cater to volume, it is not as large a facility as the one at Bonaire at this time. The surrounding facilities on the island, and the hotel in particular, are not as sophisticated as on Bonaire. It is a more laid-back atmosphere.

SDM: You have spent practically your entire adult life running dive operations. What do you think that you'd be doing today if you never learned to dive?

Hughes: Probably drilling holes in the ground and producing oil the way I was taught on my first real job. I'm glad that didn't happen. Or, maybe I'd be a bush pilot somewhere—I've recently learned to fly and that's my hobby now. And, I'd probably be chasing Alice around Kansas or the Caribbean just the same.

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SUNSEEKER'S RED SEA

Sunseeker Holidays, in cooperation with ALIA Airlines, is offering an all inclusive scuba diving vacation to the Red Sea. The program features round trip air fare from New York City; hotel accommodations (double occupancy), including one night in Amman; meals (breakfast plus choice of lunch or dinner); transfers to and from airports; nine dives with tanks and weights. Extra dives plus sightseeing tours of Petra and the Wadi Rum Desert are available. For further information, contact: Sunseeker Holidays, 1780 Broadway, New York, NY 10019 or phone (800) 422-2020.

PLANTATION BEACH

Plantation Beach is a new, small resort on Los Cayos Cochinos, in the Bay Islands of Honduras. It is designed to be a place for people who want to be a part of nature—not apart from it.

The islands in this area are largely uninhabited. Native fishermen and sailing boats make up most of the population. Accommodations are rustic, but comfortable. The resort concentrates on the basics: food, air and diving.

For additional information or week availability, call (713) 789-6790.

VILLA OLGA/MOHAWK II

The Villa Olga/Mohawk II land/cruise package offers a land based hotel room and a stateroom aboard a dive boat. After four nights on St. Thomas at the Villa Olga, with daily diving, guests board the 68 foot, *Mohawk II* and proceed to out-island dive locations in the U.S. and British Virgin Islands. The *Mohawk* is a live-aboard vessel with 11 private air-conditioned staterooms, dining salon and sun deck. Boardsailors, Sunfish sailors and a Boston Whaler tender (for out-island mobility) enhance this vacation package. The land/cruise package includes all accommodations (double occupancy), all meals on the *Mohawk II*, and continental breakfasts at Villa Olga.

For more information contact: St. Thomas Diving Club, Villa Olga, P.O. Box 4976, St. Thomas, USVI 00801.

SMALL TO THIRD TURTLE

The Third Turtle Inn Resort, Providenciales, Turks and Caicos Islands has a new dive operations manager, Stephen Small.

The Third Turtle offers a complete watersport facility. Scuba diving, fishing, snorkeling, boardsailing and sailing are offered through the resort. Photographic instruction, helpful hints and E-6 processing are also available. For information

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MCCASLIN TO RIDING ROCK

Dick Batchelder, president of At Reef Ventures, has announced the appointment of Clark McCaslin as resort dive-master and scuba instructor at the Riding Rock Inn Resort.

McCaslin began diving Lake Michigan in 1973 and became a certified YMCA scuba instructor in 1974. He became a certified PADI instructor in 1982.

Most of McCaslin's diving experience has been in the Green Bay, Wisconsin area of Lake Michigan. He spent much of 1981 working on the recovery of historical artifacts from the *Erie L. Hackley*.

The Riding Rock Inn Resort will be McCaslin's first opportunity to work as a warm water resort dive-master. Located in the southern Bahamas, Riding Rock is a major scuba resort featuring five dive-masters, four dive boats and a full service underwater photo lab. The resort caters to divers exclusively and accommodates 60 guests per week. 🐠

SPANISH COVE

Spanish Cove, the 20 unit resort on Grand Cayman's secluded northwest coast, now has opened its Scuba Center dive shop. Featured is a retail and rental shop; a special room for guests to store equipment; a large freshwater rinse tank; and a storage area for 200 new aluminum 80's. There are also three compressors with a storage capacity of 12,000 cubic feet of air.

Three PADI/NAUI certified instructors staff the resort's dive operation, with its two custom dive boats—a 36 foot Bristol Blue Water Flattop and a 38 foot Delta.

Daily trips include a two tank morning dive and an afternoon one tank shallow dive. Night dives for a minimum of six people are offered on Wednesdays.

Special seven night dive packages are available for winter 1983 as are special group rates for ten or more.

For more information contact P.O. Box 1014, Grand Cayman, or phone (809) 949-3765. 🐠

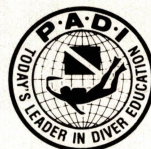
DIVE IN AUSTRALIA/QANTAS

Australia's national airline, Qantas, and Dive in Australia have a new ten page, all color brochure inserted with the Dive in Australia Vacation Planner. This comprehensive listing shows all costs and trips scheduled for 1983. Many of the departures coordinate with the Qantas-Townsville service.

For more information contact your nearest Qantas office or: Dive in Australia, 680 Beach Street, Suite 498, San Francisco, CA 94109. 🐠

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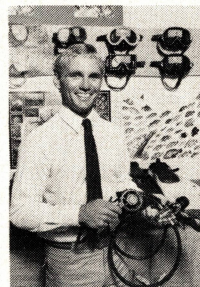
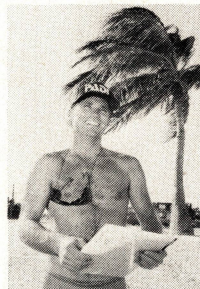
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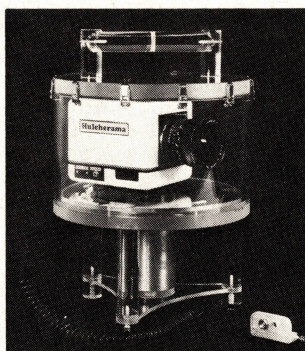
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HULCHERAMA

360 degree high altitude camera modified for undersea assignment

BY PETER SKINNER



photo/Roger Dunn

The nosy Nassau grouper would not go away. Time and again he thrust his gently aggressive face into the picture, creating yet another difficulty for the two divers testing an U/W camera capable of recording 360 degree panoramas.

For the divers this marine environment was just like home; between them they had accumulated hundreds, probably thousands, of undersea hours. But the camera they were testing was designed for an environment far removed from this aquatic wonderland in the Caribbean.

The divers, Ernest Brooks II, president of Brooks Institute, School of Photographic Art and Science, Santa Barbara, and Louis Prezelin, an eight year veteran of the Cousteau organization, were putting the Hulcherama panoramic camera through its final phases in undersea testing; testing which had started months and hundreds of rolls of film earlier. Originally designed for high altitude work by its creator, Charles Hulcher, the panorama camera had been modified for undersea assignments. Inside its specially built housing, with the film and optical system modified to compensate for undersea photography and boosted battery power circuitry, the Hulcherama used by Brooks and Prezelin was unique. And, the 360 degree panoramic pictures it produced were also unique, capturing undersea scenes as they had never been captured on film before.

Basically the Hulcherama camera rotates, with the roll of 120 film pulled across the film plane as the camera turns. There is no shutter mechanism, with that aspect of exposure determined by rotation speed. Regardless of rotation speed only three exposures can be made on one roll of film. Also, because of the relatively slow rotation, swimmers, fish, bubbles or any other movement in the panorama can cause problems. While it

is possible to obtain cooperation from fellow divers, fish, such as curious Nassau groupers, pose difficulties.

"Those fish kept arriving just when we didn't want them, and although we would have welcomed them most times, they were a darn nuisance during testing," said Brooks.

"We didn't blame the fish for being naturally curious but we had spent considerable time and effort getting ourselves and the camera gear to San Salvador, so we had to work out some way of avoiding them. Fortunately, as well as being curious, the groupers were also consistent in their feeding habits. So while they ate, we did our testing," said Brooks.

Before the camera could be taken underwater several modifications were made to compensate for the different refractive indexes of air and water and to solve other problems posed by an underwater environment. These modifications involved placing a +2.25 cylindrical diopter on a vertical axis on the front of the camera's standard 35 mm f3.5 lens, altering the film speed drive and film plane and developing a special battery pack.

The plexiglass housing, pressurized to 100 feet, was built by Larry Stoltze of Santa Barbara, a former instructor with Brooks Institute's undersea photography program. This special piece of equipment, with its curved surface, also created optical problems. Ernie Brooks explained: "As the camera scanned horizontally the lens viewed through what was in effect a curved port while the vertical view was through an effective flat port. This resulted in astigmatism and had to be corrected by using a diopter in front of the lens. And, because of the different refractive indexes of water and air, we had to alter the film plane-lens relationship to compensate. Having done this, which in effect altered the focusing,

photo/Ernest Brooks II and Louis Prezelin

we then had to modify the film drive mechanism to ensure the drive speed synchronized with the new optics."

The problems associated with taking a rotating camera designed for high altitude work underwater were not unsurmountable but they did challenge the capabilities of Brooks Institute's Industrial Scientific Department staff. Once actual testing in the water started, initially in a swimming pool, more headaches arose. Internal reflections within the circular housing created annoying, and image damaging, flare. To reduce those reflections the top and bottom surfaces of the housing were painted black, as was the camera itself.

It was also found that extra friction, pressure and condensation of an underwater environment combined to excessively drain the camera's power system. However, by boosting this to 8.5 volts from 6 volts by adding an extra battery in series, the power deficiency was made up. The extra voltage also enabled more rolls of film to be shot without changing batteries. On an average, 12 rolls of film could be shot on one set of batteries.

Triggering the camera was done by remote control. As there is no shutter on the Hulcherama, the speed of rotation and an adjustable slit (A, B, C, D) determines the equivalent shutter speed. It has a maximum rotation time of 64 seconds on slit A which is equivalent to a four second exposure, and a minimum rotation time of two seconds on slit D, equivalent to 1/125 second. Intermediate rotation times and slit widths are four seconds (1/60), eight seconds (1/30), 16 seconds (1/15) and 32 seconds (1 second). The f3.5 lens' minimum aperture is f22.

Over a period of several months the camera was put through its paces and two comp books, representing a total of about 200 rolls of film, were filled in the process. Using 200 ASA Ektachrome film, Brooks and Prezelin determined f11 and an 8 second rotation as basic exposure for good daylight conditions.

Because there are no external controls, the exposure, rotation time and focusing had to be pre-determined before diving. And, as only three exposures could be made on one roll of film, the photographers had to be very clear about their requirements underwater.

Extra illumination had to be provided by incandescent lights, usually in the vicinity of 3000 watts, as strobes could not be synchronized with the system.

"Although there were quite a few problems associated with modifying the camera, there is no denying its potential and the images produced were really exciting. Because the camera rotates, encompassing a panorama, there is no distortion as evident with a wide-angle lens. The entire scene is depicted naturally without distortion," said Brooks.

The camera, which weighs about 50 pounds, had neutral balance in the water



The Hulcherama camera, in its special underwater housing, can take vertical or horizontal format photographs on 120 film which can cover an entire 360 degree field of view.

and was weighted with lead. That and a tripod kept the system firmly anchored to the bottom when Brooks and Prezelin took it to San Salvador for the final test.

Columbus Landings, San Salvador was chosen because of the clear water, excellent support facilities and because there is a professional photo laboratory on hand.

Everything panned out well for the San Salvador excursion: the water was clear, especially in the area of Columbus Landings, and in fact the bulk of photography was done near the site where the famous explorer dropped anchor on his first voyage of discovery in 1492.

"During the pool testing we had discovered that the photographer must remain below the viewing level of the lens. And, he must also control his breathing so bubbles do not appear in the picture. We also found that divers have to swim very slowly, preferably staying stationary while in view. But, we had not allowed for nosy fish and the curious Nassau groupers were a new problem. "However, having solved so many problems en route to

this crucial stage it was just another obstacle to be overcome. Louis and I came up with the answer and our experiments with the Hulcherama concluded successfully," said Brooks.

Over the years numerous pieces of equipment have been put through their paces at Brooks Institute and Brooks said it is never simply a matter of just running a film through. Many hours, and hundreds of rolls of film, are usually expended en route.

At a base price of about \$3,200, without the modification, the Hulcherama is not exactly the type of camera the average weekend enthusiast would use. But, in the hands of a professional looking for something unique, it has virtually unlimited potential.

"The 360 degree panorama on 2 1/4 inch film creates an ideal format for mural purposes, and one of the pictures we took, a bottom to surface shot, is now an eight foot high, 29 inch wide mural," Brooks said. "I think it opens up new horizons for commercial premises and home decor."

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Rx FOR DIVERS

(Continued from Page 26)

tissues when they expand. We have discovered recently that bubbles trigger actions in blood and tissue which are like the response to infection, trauma or burns. We know, for example, that when bubbles get into the blood, they trigger clotting and cause blood clots to be formed in blood vessels, especially veins. We also know that bubbles cause the blood vessels to leak plasma into tissues causing the tissues to swell. Swollen tissues often have poor circulation as the swelling builds up and shuts off blood vessels. If plasma leaks into the lung tissue, there can be a block of normal oxygen transport from air to blood, and inadequate oxygenation of tissues will result. Decompression sickness bubbles also activate cells in the blood (leukocytes) which will damage the inner lining of the blood vessel wall: the damaged vessel walls are prone to blood clot formation.

All of these changes in the blood, blood vessels, and tissues are new concepts in decompression sickness. They tell us that decompression sickness is not a unique illness but is similar to many other illnesses which trigger the same reaction. Furthermore, the treatments which have been found successful for these other illnesses seem to work in treating decompression sickness as well. Now when we treat decompression sickness, we rely on recompression and hyperbaric oxygen but add cortisone to block leakage of plasma from blood vessels, aspirin to block part of the blood clotting mechanism, intravenous fluids when there is evidence of plasma loss from the blood stream, and sometimes drugs which block other blood clotting mechanisms not inhibited by aspirin. There is no doubt that we will find other useful drugs in the future for treatment of decompression sickness.

If you find yourself in need of treatment for decompression sickness, you can expect to be treated in a hyperbaric chamber with pure oxygen, intravenous fluids and several other medications which are given to prevent or reverse abnormalities triggered by the bubbles. These newer treatments seem to reduce the amount of permanent injury resulting from decompression sickness. 

BWIA/CANADA

BWIA's Canadian office offers reservations to Tobago and Barbados. Tobago packages include the Mount Irvine Bay Hotel and Sandy Point Beach Club, using the full-service dive facilities of Dive Tobago, operated by Jim Young. Also available is the Crown Reef Hotel serviced by the Adventures Unlimited Dive Shop. Canadian residents should contact BWIA, 44 King St. West, Toronto, Ontario. 



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a month quartz precision. In addition to a thermo-alarm, you also get a daily wake-up/appointment alarm and an hourly alarm. Of course, all can be silenced with a button. Press another button, day and date appear. And another for a built-in night light powered by a long-life lithium battery.

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The featherweight black polysulfone TS-1000 is available for only \$49.95. So lightweight and comfortable you may never realize that you're wearing the most advanced underwater watch on the market today. For only \$79.95, you can get the all stainless steel model TS-3000. Both are rugged and withstand water in any form — sweat, rain or total submersion.

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CASIO's Deep-Water Chronographs are the first and only 200 meter quartz digitals available anywhere. Working for you from over 660 feet deep, these watches have 12/24 hour time, a 7-year battery life, unique 12-digit display which allows you to see time in every mode, one-hour 1/100 second stopwatch with a repeat, countdown alarm, daily alarm, electronic calendar, time signal and night light. In the countdown alarm or stopwatch modes, a signal confirms a start and a signal sounds (even underwater) at 10 minute intervals.

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CUBAN FEVER

BY STEVEN M. BARSKY

My diving partner, Jack Drake, shouted, "It's over here!" as he lifted his head out of the water. Twenty five yards away from him, I looked up to see where he was pointing. We were snorkeling off the western end of San Miguel Island at a place known as Point Bennett. In the midst of the "foul area," with shoaling waters surrounding us, we were searching for the wreck of the steamer *Cuba*. She had gone aground here on September 23, 1923 carrying a cargo of mail, coffee and \$2,500,000 in silver bullion. We were working off our own boat, the *Navanax*, a 20 foot Radon, in waters which were only navigable perhaps ten days out of the entire year.

As I snorkeled toward Jack, I scanned the bottom for my first glimpse of the wreck. The deepest portion of the foul area is only 30 feet, with numerous rocks reaching to within inches of the surface. The water is exceptionally clear, as the island is surrounded by open ocean. Traveling down the California coast, the long Pacific swells move through this deep water unhindered, until they encounter San Miguel. Then, even small swells become thundering waves which crash ashore amidst the sand dunes where the marine mammals bask in the sun. Other ships besides the *Cuba* have met their doom at San Miguel, including the three masted schooners *Comet* (in 1911) and *J.M. Coleman* (in 1905) as well as the four masted windjammer *Watson A. West*, which went aground just six months before the *Cuba*.

Approaching the spot where Jack was floating on the surface, my initial view of the wreck was a mass of twisted pipes and jagged pieces of plate. The sand surrounding the debris was the color of rust. Hurriedly, we made our way back to our boat to get our scuba gear. It was an unusually calm day and it looked as though our luck was beginning to break.

Back on the boat, we helped each other with our tanks. Jack grabbed his camera and I picked up a lift bag. I was so excited I could hardly stand it! We had been looking for the *Cuba* for over half a year. On numerous occasions we had made the three hour trip to San Miguel, only to be confronted by pounding surf as we rounded the corner at Point Bennett. We had seen pictures of the *Cuba*, all 8000 tons of her, so we knew she was a big ship. Twice, we had penetrated the foul area, but each time we had failed to locate her broken hulk.

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Hovering above the wreck on the surface, we dumped the air from our buoyancy compensators and began to descend. As we drifted toward the bottom, I thought about the history of the ship. She had been built in 1897 in Hamburg, Germany, and originally christened the *Coblentz*. Lost in a fog, 26 years later, she hit a rock reef on the tip of San Miguel. If only she had been a few hundred yards further west, she would have completed her voyage to San Francisco in safety. High on the reef, in the fall of the year when California weather is at its best, she sat there for several days with her back broken. No lives were lost. Supposedly, all of the \$2,500,000 in silver was removed, although rumors among some of the old time divers in Santa Barbara say this was not the case. Nobody seems to know for sure.

Salvage rights to the *Cuba* were purchased by captain Ira Eaton of Santa Barbara from Lloyds of London for the sum of \$800. Using his vessel the *Sea Wolf*, Eaton removed many of the ship's fittings and much of her valuable machinery. During the course of his work, Eaton was challenged by armed pirates, but he was able to drive them off without bloodshed. He continued stripping the derelict of all items of value until a heavy storm toppled the remains of the ship off the reef. She lay there, unmolested, for many years.

Abalone divers had visited the wreck, but they were unwilling to disclose her lo-

cation to us. Through a combination of detective work and bribery, we had finally been able to obtain enough information to put us in her general vicinity. On our prior trips, we had scoured the area surrounding the first line of rocks inside the foul area. This time, I had consulted the charts again, and realizing our previous mistake, had anchored our boat within a few yards of the second reef line. It was there we found the *Cuba*.

Touching down on the bottom, I immediately ran across the back plate of a brass porthole. For me, this set off an extreme case of brass fever, characterized by heavy breathing, trembling hands, and heart palpitations. I must have gone through half a tank of air in 10 minutes! Within a few moments, we were at the stern section of the ship. Individual features were instantly recognizable, especially the large tubular smokestack and characteristic funnels. A completely intact porthole was lodged beneath a heavy steel plate. Unable to move it, we continued on.

Twin propeller shafts rode the outline of the hull on either side of her intact engine room. Schools of sheephead swam through the maze of piping which had supplied her steam driven machinery. She was all I had hoped for and more. Jack's electronic flash froze image after image in my mind. We found a section of decking, which must have come from one of the main salons, covered with a

beautiful indigo blue tile. On the perimeter of the hull, individual plates from her cabins bore the scars where portholes once hung. It was obvious that other divers had been here before us.

I was running low on air, so I signaled Jack it was time to work our way back across the bottom toward our boat. As we pulled ourselves along the marine growth-encrusted wreckage, Jack suddenly paused. His hand had come to rest on a camouflaged porthole, covered with red and brown algae. It was still attached to a steel plate, however, and it seemed as though the combined weight of the two items might exceed the liftbag's capability. I connected the liftbag to the porthole and Jack inflated it with air from his octopus. Gradually, the load began to rise; the two of us riding it up toward the surface. About ten feet from the top, the rusted bolts holding the brass gave way, and the steel fell back to the sea floor. We flared our fins to slow our ascent, breaking the surface gently, laughing all the way back to the boat.

The *Cuba* is still lying there off Point Bennett, waiting for visitors who are willing to be patient with the seas found there. Only the sea lions and elephant seals get to dive her with any regularity. There are no scheduled charters to the foul area of San Miguel. If you have a friend who has a boat and he's crazy about shipwrecks, the *Cuba* is worth the wait. 

Remember the one that got away?

You won't have to with Sunpak's Marine 32 underwater electronic flash. Distinct from all other underwater strobes, the Marine 32 can't be damaged even in the unlikely event of water leakage in the battery compartment. Should water seep in, a built-in flood alarm lights up. Just dry out the compartment and then go back to shooting. All its internal components are completely sealed and its rubber housing is impact-absorbing to withstand pressures down to 330' (100 meters).

The Marine 32 is dedicated to the Nikonos III and electronically dedicated to the Nikonos IVA. It can also be used with the Nikonos I and II with an optional adapter plug. Multiple flash is simplified with the unit's built-in auto-slave. In addition, the flip of a switch provides many lighting ratios at full or one-half power for various

creative techniques, particularly close-up photography. And six AA Alkaline or Nicad batteries will generate up to 150 flashes with recycle times as fast as 3 seconds.

What's more, the #24 filter diffuser widens the underwater beam angle to that of a 28mm lens while its optional #16 filter widens it to a 20mm. And with its GN of 106 (53 underwater) at ASA 100 in feet, one Marine 32 is all you need for most lighting situations.

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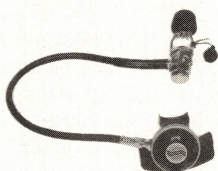
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Underwater Life Support Systems are potentially dangerous to a non-trained user. These include scuba tanks, regulators and buoyancy compensators. This ad does not constitute an offer to sell these items via mail order.

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EDITORIAL

(Continued from Page 4)

contain warnings that the equipment is not to be used without proper training. It is in the best interest of the mail order seller to ensure that the equipment is not involved in a dive accident.

2) The dive industry must find ways of warning purchasers of used equipment that they should take training before attempting to use the gear. Perhaps the training associations could launch a campaign to educate the consumer on the need for training before using new or used gear. This sort of publicity could be further supported by posting signs in local dive shops and circulating warning posters to YMCA's, community centers, boy's clubs, and other public facilities with pools. Very possibly DEMA might want to step in and support further publicity with news releases and announcements circulated to various newspapers and magazines throughout the U.S.

3) We must also find a way to convince certified divers that they should not attempt scuba training unless they are certified instructors. A casual approach to training can result in disaster. No matter how easy scuba may seem, the business of teaching it is a very exact science. Once again, the training associations can play a crucial role in getting this message across to classes.

What is SKIN DIVER going to do? Commencing with the next issue, this publication will carry a public service announcement informing the public that scuba diving can be fun and is safe as long as a formal scuba training course has been taken.

HAND TRUCK CORRECTION

In the October issue, SDM featured the 4-Wheel Wonder dolly/hand truck in the New Gear section. The correct price of the dolly is \$29.99 plus \$6.90 shipping and handling.

For information contact: DRI Industries Inc., Dept. KG, Box 20612, Bloomington, MN 55420.

LIFT BAGS IN PIPELINE REPAIR

Gripper Inc. has successfully used J.W. Automarine PR-5 lift bags to complete a recent underwater pipeline repair job in the Gulf of Mexico. A five ton open bottomed lift bag was used to make the Gripper coupling neutrally buoyant, thus enabling a single diver to control all raising and lowering. By not having to rely on a surface line to move the coupling, Gripper personnel avoided any surging from surface conditions, and performed their repair tasks safely and quickly.

For further information please contact:

J.W. Automarine Corp, One North Broadway, Suite 620, White Plains, NY 10601; or 5156 Pacifica Drive, San Diego, California 92109. 

SEARCH AND RECOVERY TRAINING

The National YMCA Scuba Program will host a search and recovery training course on Feb. 14-18 in Key West, Florida. The course is intended to provide training to fire, police and other rescue personnel involved in water recoveries. All aspects of search and recovery will be fully covered in both lecture and water sessions.

For further information contact: YMCA Search and Recovery Committee, 120 Rose St., Phillipsburg, New Jersey 08865. 

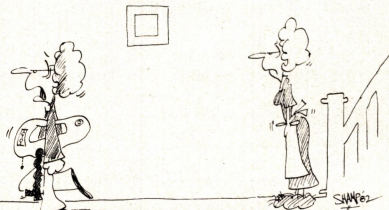
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LAWRENCE/PRO DIVE

Pro Dive of Pompano and Ft. Lauderdale, Florida has enlisted the services of photographer Mark M. Lawrence, a multi-certified instructor. His work has ap-



peared in various periodicals and educational programs. His freelance experience has ranged from interior design for offices and advertising campaigns for developers to work on film locations for professional cinematographic companies such as Mako Films, Ltd.

DIVE SHOP CREDIT CARD

Divers Unlimited of Hollywood, FL is the first store in the diving market to put its own credit card into use. The VID (Very Important Divers) card is a full scale, in-house credit card that allows customers to obtain equipment, classes and trips with just their signature. Credit is approved the same day application is made via an in-house TRW computer linkup. An attractive plastic card is issued to each customer, and monthly statements are processed by the Divers Unlimited computer system.

The VID credit card is currently recognized in several resorts in the Caribbean and Bahamas, including Fantasia Divers in Cozumel, Mexico. Plans are underway to open it on a wider scale in the future.

Specific questions may be answered by contacting Dave Inman, president of DU, at (305) 981-0156.

PADI SCUBA REVIEW

PADI has introduced a program aimed specifically at divers seeking a review or upgrade of their knowledge and skills. This new PADI Scuba Review course is perfect for those seeking a refresher-type experience prior to a dive vacation, an advanced or specialty course, or after a period of inactivity.

In conjunction with the Scuba Review course, divers may also take part in an optional open water experience dive. This experience consists of an environmental orientation and a supervised pleasure dive conducted by a PADI instructor, assistant instructor or divemaster.

More information on the new PADI Scuba Review program is available from PADI Headquarters, 1243 East Warner Avenue, Santa Ana, CA 92705, or your local PADI training facility.

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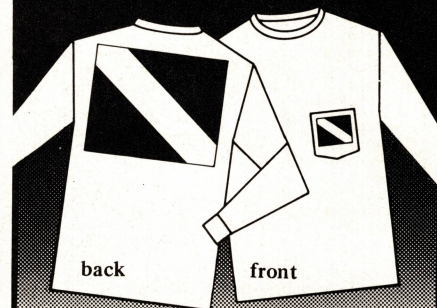
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Ikelite Underwater Systems of Indianapolis and Float N' Flag Sport & Dive of Burlington, Ontario have opened an Ikelite full service repair centre. Float & Flag



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Items can be shipped directly to Float N' Flag Sport & Dive, 564 Plains Road East, Burlington, Ontario L7T 2E5.

DAN ACCIDENT MANAGEMENT COURSE

The F.G. Hall Laboratory, in cooperation with the National Diving Accident Network (DAN), will hold a course on diving accident and hyperbaric oxygen treatment at the Searle Center for Continuing Education, Duke Medical Center, Durham, NC, March 3-5. The course carries credits for 22 hours Cat 1 AMA; 22 hours Cat A NC Medical Soc; 22 hours Cat 1 ACEP and AAF. The course is designed to develop an understanding of the management of dive accidents and their treatment. Further information may be obtained from Cindi Easterling, M. Ed. Office of Continuing Education, Box 3306, Duke Medical Center, Durham, North Carolina 27701.

GREAT LAKES CHARTERS

Kimm A. Stabelfeldt, author of *Explore Wisconsin Shipwrecks* and *Wreck Divers Handbook* is currently compiling a book that will provide Great Lakes charter information to area divers. Stabelfeldt would like all Great Lakes charters to send him information on their services (rates need not be included). All listings will be free of charge. Contact: Kimm A. Stabelfeldt, 7844 St. Anne Ct., Wauwatosa, WI 53213.

AQUATRONICS GENERAL MANAGER

Author James F. Jenney has been appointed national general manager of Aquatronics Co., a division of Rowe Publishing Corp. Jenney, author of *Shipwrecks of New England*, *Diver's Directory to Shipwreck Research* and *Diver's Guide to River Wrecks* is also a member of CEDAM International. As manager, he will direct operations of one of the newest dive manufacturing firms in the industry. Aquatronics will debut its products early in 1983.

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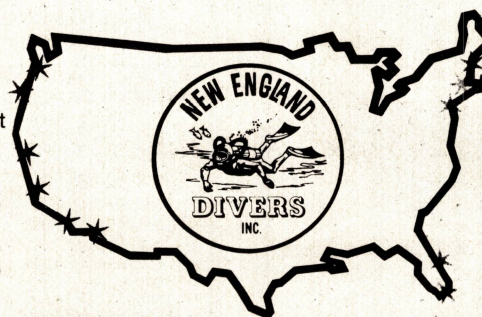
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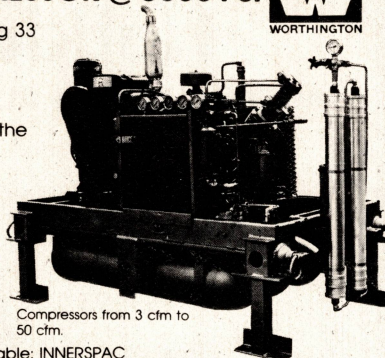
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CHRISTMAS UNDERWATER

Dixie Divers hold their office party beneath Blue Springs

BY BOB BURGESS

Throughout the nation, about the same time every year, businesses throw what is commonly called the Christmas office party. Few businesses anywhere can claim a party to compare to that of the Dixie Diving Shoppe in Tallahassee, where the wing-ding they throw has everyone getting soused instantly before the festivities even begin. The reason is that this annual Christmas party is always held underwater!

To give you a report at depth on this peculiar affair, I joined 20 other business associates of this shop to celebrate the occasion one Saturday at Madison, Florida's Blue Springs. All partygoers came garbed in their warmest wetsuits, not so much because the springs' year around 72°F temperature might feel cold but because northwest Florida that day was enjoying a not-so-balmy 40°F air temperature. The difference made everyone anxious to get underwater where they could be warm. So, on went the scuba gear and the party got off to a big splash.

The spring felt warm. It was the color of a blue sapphire. I descended slowly through a thousand tingling bubbles from the shadowy divers beneath me. And, there below, we saw that Santa's helpers had preceded us. Jauntily perched on the sloping sand bottom was a brightly lighted Christmas tree, its tiny, battery powered, colored lights glowing gaily in the twilight depths, its tinseled icicles and balls sparkling in the golden shafts of sunlight from above. Only one decoration went awry. Caught in a wayward current, a tiny angel of Styrofoam chose that moment to take flight. When last seen, it was winging downstream, slowly ascending toward heaven.

My head seemed to be ringing with a rousing rendition of Jingle Bells. A bit more bubbly than usual but still the recognizable holiday song. We were halfway through Silent Night before I realized all of it wasn't just in my head. Christmas carols were playing underwater from a cleverly concealed hydrophone.

Surrounded by music, the 20 eager

ewa-marine space suit for your camera

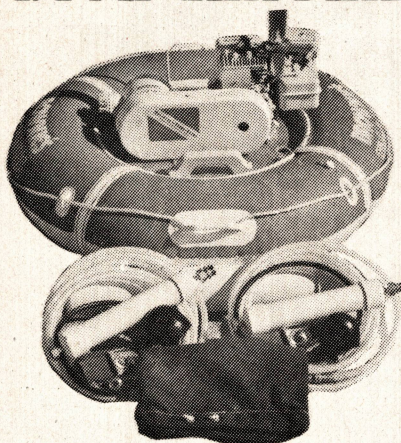
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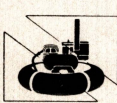
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partygoers formed a circle around the glowing Yuletide tree. We were a spirited group of merrymakers, so spirited in fact that some of Santa's helpers had to caution us in sign language about kicking up our heels too vigorously. The resulting sand storm was obliterating the Chirstmas tree. Once swim fins quieted, the sand settled and the party got on with its fun and games.

First came the apple bobbing contest. Admittedly, this was a carry-over from the shop's underwater Halloween party, but it was a sure party pleaser. Row upon row of large red apples appeared, each tied by its stem to a length of string and floating upright from wooden plank bases. For this breath-taking event, all participants lined up on their knees. At a given hand signal the divers removed their regulators, and while holding their breath, tried to take bites out of their apples. One needs to try this underwater to realize it is virtually impossible. About the time you think the apple is trapped between your chin and your shoulder, it bobs away and flies up over your head. Once you try the overhead approach and try to corner it on the bottom, it vanishes in a cloud of sand. You scramble to get your regulator into your mouth for a welcome breath of air, then it's back after the apple again. The only way to succeed is to join forces with a fellow diver and try to wedge the elusive target between your faces, then al-

ternate taking bites, being particularly careful not to lose one's nose or chin in the action. Then, after having bitten out a chunk of apple, the trick is to chew it up and swallow it before needing a breath of air. Frankly, I prefer dunking for apples above the water.

Next was the old try-and-eat-a-banana-underwater-without-choking game. Large bunches of the fruit were passed around and each diver took one. Cautiously I peeled mine part way and looked around to see how others were doing. Everyone else with half peeled bananas was looking at me. One of Santa's helpers appeared. I recognized him, despite his voluminous red stocking cap, as one of the shop's dive instructors. Removing his regulator, he casually demonstrated how to eat a banana underwater. It looked easy. Summoning our courage, we all tried. I was amazed to find I could actually do it without choking in the process. Certain nuances of the thing you learn quickly. For example, eating a mushy banana underwater while holding your breath calls for tiny mouthfuls and fast assimilation of the chewed fruit. Some participants found that by tilting their heads slightly downward they could more easily chew up and swallow their bananas. I personally discovered that a small sip of spring water helped the process.

Probably to help wash down the bananas, we were next served orange



photo/Bob Burgess

drinks and Cokes. I was in trouble the minute someone passed me a bottle opener. As soon as I popped the cap on a bottle I saw the drink spiraling out like a thin wisp of smoke. Quickly I pressed my thumb over the opening, wondering what to do next. How do you drink underwater while holding your breath?

Again, one of Santa's helpers came to my aid by demonstrating what I was to do. It looked to me like all he did was take the regulator out of his mouth, upend the bottle of Coke and let nature do it thing; the liquid naturally flowing out the open end into his mouth.

Trouble was, when I tried it, nothing came out. Defying the law of gravity, the liquid stayed in its bottle. Only after more demonstrations did I see how it had to be

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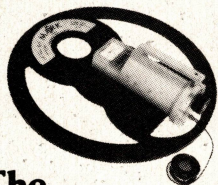
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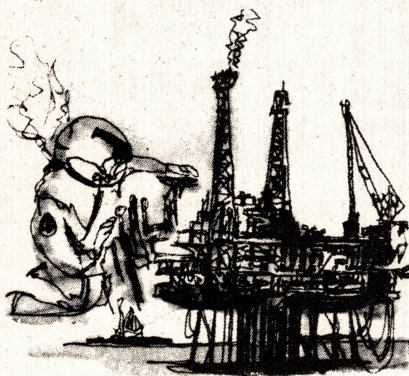


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U/W CHRISTMAS

done. Instead of holding your breath, air had to be released into the bottle from your mouth to get the soft drink to gurgle out. Then, somehow, you had to catch the liquid at the same time and swallow it. I did the best I could but managed to swallow more spring water than Coke. Imbibing from a bottle underwater was clearly not my forte. By then, however, as Santa's helpers collected the empties, we were motioned toward the deeper end of the spring where divers had gathered on their knees before the black opening of the spring cave. Gliding down among them, I settled quietly to the sandy bottom. Everyone waited expectantly. Indeed, from the long intervals between exhalations you could say they were even waiting a bit breathlessly.

The hidden hydrophone blared Joy to the World and then, suddenly, framed in the mouth of the cave in bright red wetsuit and billowing red stocking cap, was the jolly gentleman himself—good ol' St. Nick. From a golden goodie bag large enough to hold a dozen lobsters, he dispensed handfuls of brightly colored, foil-wrapped chocolates into the currents and rained them down all about us. It was the perfect touch, the ideal Christmas scene: Santa Claus dipping into his big bag and benevolently showering the glittering little gifts on his children as the voices of the hydrophonic carolers swelled forth with "God bless ye merry gentlemen. . ." We had everything but the prancing reindeer.

Despite the general scramble for chocolates that instantly stirred up clouds of sand, I recognized St. Nick. Admittedly, the tummy pillow in the wetsuit fooled me for a moment, but when his beard of Styrofoam parted company with his chin and floated off in the direction of the Christmas tree angel, I recognized Dixie Diving Shoppe owner, Terry Zimmerman.

Like the happy kids we were, we scrambled to collect the glittering goodies before they drifted away. Popping a chocolate into my mouth and munching it between breaths was a lot easier than eating a mushy banana.

Finally, with the underwater festivities over, we reluctantly left the warm water to climb into icy winter winds and a chill factor you wouldn't believe.

But what's this! Spread before us on shore was a roaring campfire with Santa's helpers passing out platefuls of barbecued chicken and coleslaw to be washed down with steaming draughts of pungent cinnamon cider! It was a sight to warm the cockles of your heart. As I swiftly sloshed toward it, I couldn't help but observe that while this may have started out being one of the strangest Christmas parties I had ever attended, it was fast turning into one of the best ones. ❧



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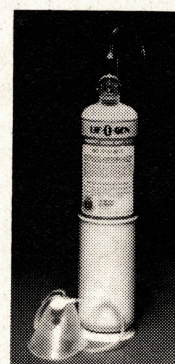
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PADI IN EUROPE

PADI International has opened a European Service Center. Operated by PADI EU Services, Ltd. it is centrally located in Switzerland, providing faster processing of registration and material orders for instructors and training facilities throughout western Europe. Instructors and training facilities will still maintain membership annually through International Headquarters in the United States. The new service center is headed by Jack Lavenchy, who will be working closely with Steve Metcalf, international regional training coordinator.

For more information contact PADI EU Services AG/SA Ltd., Postfach 621, 8401 Winterthur, Switzerland; or PADI International, 1243 East Warner Avenue, Santa Ana, CA 92705.

SEARCH AND RECOVERY TRAINING DIRECTOR

Stephen Hardick has been named director of training for Search and Recovery Associates. His duties include coordinating all search and recovery training, distribution of training aids, manuals, and liaison with federal, state, and local rescue agencies.

Hardick may be contacted at: Search and Recovery Associates, P.O. Box 1105, Alpha, New Jersey 08865.

DON'T DIVE SHINNECOCK

The Board of Trustees of Southampton, NY would like to inform the public that swimming, snorkeling and skin diving are prohibited by law in Shinnecock Inlet, Southampton.

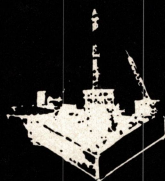
HUC U/W PHOTO CONTEST

The Houston Underwater Club (HUC) of Houston, Texas is sponsoring an International Underwater Photography Contest in conjunction with its Seaspace colloquium (June 24-26, Shamrock Hilton Hotel, Houston, Texas).

This competition includes the following slide categories: novice, open, diving related surface, series with narration; as well as color and B/W prints, and 16 mm film. Two new categories just added for 1983 are freshwater slides and experimental photography. Entries are solicited and received from all over the U.S. as well as various foreign countries.

The winning photos are viewed by the entire Seaspace film festival audience and the winning photographers receive awards especially designed and executed by Robert L. Straight.

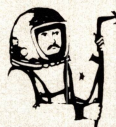
For further information or a contest entry form, please address inquiries to Robert Kershaw, c/o Seaspace, Houston Underwater Club, P.O. Box 3753, Houston, Texas 77253. Deadline for entries is June 6 and the photo judging will take place on June 11.



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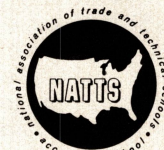
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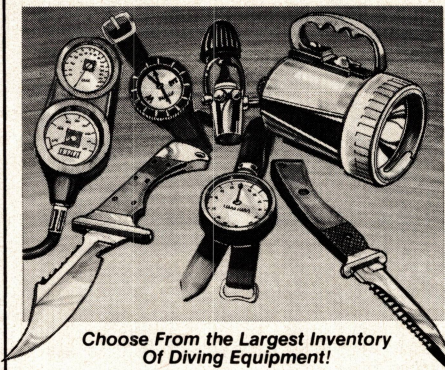
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PDSNY PRESSURE PRIZE

The Professional Diving School of New York's version of a door prize was awarded recently in City Island, New York. Ron Olive, a member of the Scuba Sport Rites Club of Westchester, New York, held the winning number and was treated to the unusual award: Pressurization to two atmospheres (about 30 feet in depth) in the school's deep ocean bell simulator.

The 20 minute pressurized trip was the highlight of a commercial diving orienta-



tion evening for dive shop operators and instructors in the metropolitan area (New York, New Jersey and Connecticut). The activities paid special attention to the deep-ocean simulator equipment of the North American Hyperbaric Center, a new addition to PDSNY.

For information on scheduling similar group visits to the diving school and its hyperbaric center, call PDSNY toll free at (800) 223-8000 or, in New York State, call (212) 885-0600.

U/W SOCIETY PHOTO COMPETITION

The Underwater Society of America has scheduled its 1982 photography competition for Dec. 1-Feb. 1. Nine categories of competition in slides, prints, movies and video will be held, and entries are unlimited.

First through third place award plaques and prizes will be given in each category and the grand prize winner, chosen from the 13 first place winners, will receive a one week scuba trip to Bonaire and a slide projector. First through third place winners will be on display at Our World-Underwater festival in May.

For information contact: Paula M. Novotny, Director of Photography, 9702 E. 12th St., Indianapolis, IN 46229.

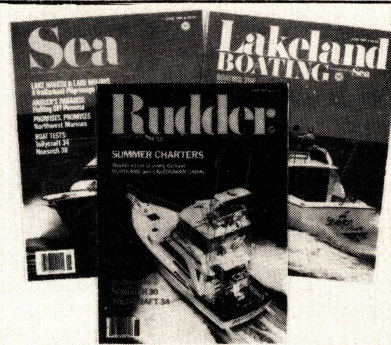
JUNEAU RECOMPRESSION CHAMBER

The National Oceanic and Atmospheric Administration, in conjunction with the Juneau City-Borough, has installed an hyperbaric recompression chamber at Bartlett Memorial Hospital in Juneau, Alaska. The \$150,000 unit is on indefinite loan from the NOAA and will provide both dive accident treatment and treatment of non-diving maladies.

Dr. William Palmer is serving as the chamber's supervising physician after taking a concentrated course in hyperbaric medicine from NOAA.

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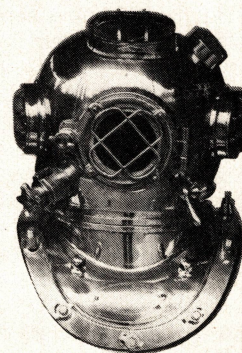
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Diver's Calendar

December 1-February 1 The 1982 Underwater Society of America Photography Competition. Nine categories of slides, prints, movies and video. Unlimited entries in each category. (Contact: Paula M. Novotny, Director of Photography, 9702 E. 12th Street, Indianapolis, Indiana 46229)

December 4 Fourteenth Annual San Diego Council of Divers Awards Banquet. Door prizes, photo contest, dancing and surprise entertainment. All divers, guests and photographers welcome. (Contact: Karen Ground, 3258-93 Caminito East Bluff, La Jolla, CA 92037; (714) 455-9069)

January 1 Twenty-first Workshop of the Cave Diving Section of the National Speleological Society. Branford High School, Branford, Florida. All interested persons are invited to attend. A \$2 discount for preregistration (before Nov. 25). (Contact: Shannon Heinerth, 6494-A, U.S. 19 N., Hudson, Florida 33568)

January 1 Eighteenth Annual Frozen Fin Dive, sponsored by South Eastern Connecticut Skin Divers (SE-CONN). New London Town Beach, Pequot Avenue, New London, CT. Registration 10:00 am, dive at 12:00 noon. Prizes. Everyone welcome. (Contact: Brian Johnson, 27 West Arch Street, Pawcatuck, Connecticut 06379)

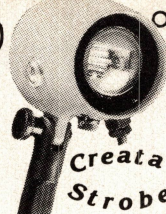
January 20-23 Diving Equipment Manufacturers Association (DEMA) show. Las Vegas Convention Center. Open to trade only. (Contact: Bob Gray, telephone (714) 730-0650)

February 4-6 Twenty-fourth Annual Ohio Council of Skin & Scuba Diving Banquet Ball at Wapakoneta, Ohio Holiday Inn. Distinguished speakers. (Contact: Art and Twink Miller, RR1, Kolter Rd., Spencerville, Ohio 45887; telephone (419) 647-4835)

March 12 Boston Sea Rovers 29th Annual Underwater Clinic. Day and night sessions will both be held at John Hancock Hall, Boston, MA. (Contact: Bunky Hodge, 174 Beech St., Rockland, Massachusetts 02370)

March 26 Underwater New York—Twelfth Annual Diving Symposium. Exhibits, artifacts and speakers. (Contact: Peter Odell, 81 Steel Street, Auburn, New York 13021)

June 24-26 Houston Underwater Club International Underwater Photography Contest. In conjunction with the Seaspace colloquium at the Shamrock Hilton Hotel, Houston Texas. Nine categories of slides, prints and movies. (Contact: Robert Kershaw, c/o Seaspace, Houston Underwater Club, P.O. Box 3753, Houston, Texas 77253)



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DEEP RESCUE

(Continued from Page 15)

1130 the chamber was hoisted over the side. Bell operators John Mihalowski and Walter Harmon boarded the chamber and at 1159 started on the first trip down.

The chamber reached the *Squalus* at 1212 and was settled easily on the rubber gasket around the hatch. Now came a critical part of the operation. First, Mihalowski and Harmon had to blow the lower compartment of the bell dry; then vent this compartment so both compartments of the bell were at atmospheric pressure. If this were done properly the force of 242 feet of water would hold the rescue bell to the escape hatch of the submarine. Mihalowski, who was operating the chamber, watched the lower compartment through the small glass port in the hatch leading to the lower chamber. When it appeared this was dry he vented the pressure. He opened the hatch and dropped quickly into the lower compartment. But instead of being dry it still had eight inches of icy water. Mihalowski recoiled from the cold but fastened the four safety bolts from the deck of the *Squalus* to slots in the lower edge of the chamber. When he was finished, Mihalowski was wet and shivering. He unhooked the downhaul wire, moved it aside, turned the wheel of the submarine hatch very slowly and, when he heard a slight hissing of escaping air, he knew rescue was possible. The small amount of water in the lower compartment of the bell dropped into the sub. Then the flood light in the bottom of the rescue bell lit up the face of Lieutenant (jg) J.C. Nichols, the first man ever to be rescued from a sunken submarine. It was 1245. Just 28 hours had passed since the *Squalus* had touched bottom.

Inside the submarine Lt. Naquin had ordered Lt. Nichols to be the first man out of the boat. He wanted at least one responsible person to reach the surface in case something happened and the rest of the crew could not be rescued. Then those men who appeared in the worst physical condition were ordered into the bell. By 1315 the transfer of seven survivors was completed. During the transfer, Mihalowski passed down blankets, hot soup and coffee and sandwiches. With the bell's air system he blew fresh air into the submarine. At 1342 the bell reached the surface and discharged the first seven survivors.

Ten minutes later the bell started to the bottom for a second load. Operators of the rescue bell were W.E. Harmon and W. Badders. Mihalowski was below deck on the *Falcon* getting into dry clothes. At

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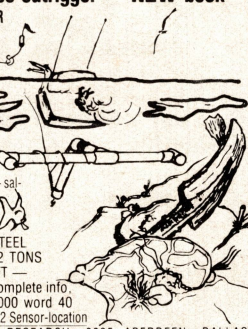
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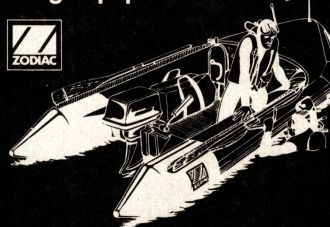
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1441 the rescue bell reached the deck of the sub for a second time. At 1515 the bell was secured and the hatch opened to receive nine more survivors.

By 1624 the rescue bell was ready for the third trip; operators—Mihalowski and Badders. There was some minor trouble engaging the clutch of the air motor that was to pull them down. But by 1702 they had reached the sub and by 1801 nine more survivors were aboard and ready for ascent. At 1827 the bell reached the surface again.

The chamber started down on the fourth and last trip to the forward escape hatch at 1841; operators—Mihalowski and McDonald. By 1931 they had reached the *Squalus* and at 1941 opened the hatch and took eight passengers on board. Lt. Naquin was the last to leave the *Squalus*. At 2011 the chamber started toward the surface, but 11 minutes later, at 200 feet the bell stalled. The winch would not work. Mihalowski tried to bring the bell up on the brake but at 155 feet this too, failed and the chamber sank to 210 feet. Mihalowski looked out the port in the side of the chamber and could see the conning tower of the *Squalus*.

A suspenseful hour passed while top-side personnel tried to make a decision on how to get the bell back to the surface. Finally, at 2112, diver W.H. Squire left the surface to cut the bell downhaul cable loose from the *Squalus*. This was done and Squire left the bottom at 2123.

The crew of the *Falcon* then started hoisting the rescue bell toward the surface. At 200 feet the chamber stopped and then suddenly lowered to the bottom where it landed alongside the *Squalus*.

It had been decided topside that a diver should be sent down to the rescue bell to attach a new lifting cable to the top of it. At 2149 diver J.E. Duncan left the surface. During his descent he noticed the lifting cable on the bell was frayed so badly only a few strands of wire were holding its weight. At 2155 he reached the rescue bell, but his reports became incoherent and faint. He was hoisted to the surface and placed in the recompression chamber. In the rescue bell the personnel were in no great danger. Fresh air could be maintained and they had good communication with the surface. The great hazard was from the cold; the temperature in the chamber continued to fall. By 2245 a second diver, E.P. Clayton, left the surface to secure the new lifting cable to the chamber. He experienced trouble with the dive lights (it was now night) and his air hose continued to foul in the cables, hoses, and ropes. Again at a depth of 232 feet the diver became confused and had to be pulled to the surface.

At four minutes past midnight, May 25, 1939, it was decided to blow ballast from the rescue bell until it became light enough to be lifted by hand. If too much ballast water was blown from the bell it would float violently to the surface with

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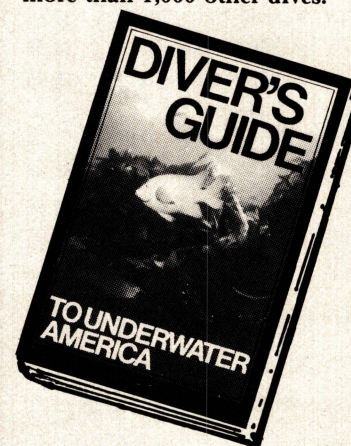
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DEEP RESCUE

disastrous results. If too little, the bell would be too heavy for the crew to lift by hand. In the chamber Mihalowski carefully blew ballast until the bell barely had negative buoyancy. Then the crew of the *Falcon*, with cold, bare hands pulled on the frayed wire until the bell reached the surface. At 0023, nearly five hours after it left the bottom, the last seven of the 33 were discharged from the bell.

By 1341 on May 25, the crew of the *Falcon* had rested and divers were being readied for dives to the after rescue hatch of the *Squalus*. In the next three hours three dives were made to the after deck to connect the bell downhaul cable. Two of the divers became totally disoriented and confused and one of these lapsed into unconsciousness. The third diver, while adversely affected by nitrogen narcosis, was able with difficulty to perform the simple task of shackling a wire to the bale of the escape hatch.

Mihalowski and Badders had secured the rescue chamber over the after escape hatch of the *Squalus* at 1803. The pressure in the bell was, in this case, increased until equal to the surrounding water pressure. The lower hatch was opened and, according to Badders, as he turned the wheel that unlocked the escape hatch, it began to shake and vibrate as a blast of air poured out of the submarine escape hatch into the bell. Badders tried quickly to close and refasten the hatch but before this could be done he was waist deep in ice cold water in the lower compartment of the bell. In the upper compartment, Mihalowski quickly blew high pressure air into the lower chamber. This stopped the inrush of water and then forced the water back into the *Squalus*. Badders then slowly opened the hatch of the sub and he and Mihalowski reported they saw only oily, black water. The submarine escape hatch and the lower hatch of the bell were closed and dogged down tight and the chamber started for the surface. The rescue phase of the *Squalus* disaster was over.

On May 26, 1939 the tremendous job of salvaging the *Squalus* began. One hundred and thirteen days later the vessel was in drydock, one day before her first birthday. Over 50 divers made a total of 640 dives during the operation.

The author of this article would appreciate hearing from or about any of the Squalus crew or the 50 or more divers who worked on the rescue and salvage of the Squalus. He plans to write another article detailing the salvaging of the sub. Write to E.R. Cross, Technifacts, SKIN DIVER Magazine, 8490 Sunset Blvd., Los Angeles, CA 90069.

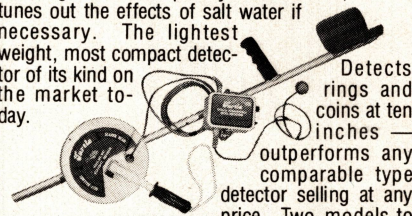
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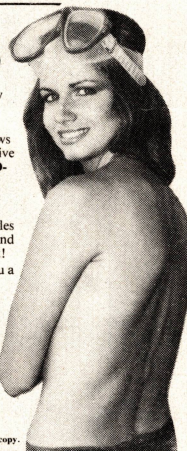
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SDM INDEX

(Continued from Page 10)

THE WRASSE BLENNY by Geri Murphy, pg. 32, Jan.
 RARE SCORPIONFISH by Carl Roessler, pg. 28, Sept.
 THE WONDROUS WORLD OF WORMS by Dee Scarr, pg. 82, Oct.
 SEA LILIES by Bill Harrigan, pg. 64, Dec.

MISCELLANEOUS

METAL MONSTER by Patricia Vanik, pg. 10, Feb.
 FEAR FACTOR by Henry James Butler, pg. 98, Feb.
 STONE TREASURE by Don Burger, pg. 124, Feb.
 LEARNING TO DIVE by Ted M. Avellone, pg. 92, Mar.
 SHARKS, MYTH AND MYSTERY, pg. 110, Apr.
 BAUER AIR COMPRESSORS by Bill Gleason, pg. 32, July
 SPEARFISHING by Dr. Heyward Mathews, pg. 88, July
 UNDERWATER CAREERS INTERNATIONAL by Rick Frehsee, pg. 40, Aug.
 GOOD-BYE GLENN by Hillary Hauser and Dewey Schurman, pg. 98, Aug.
 TALE OF TWO SHIPS by Michael Smokovitz, pg. 62, Sept.
 SAGA OF THE SAGAMORE by Thomas P. O'Connor, pg. 81, Sept.
 NIGHT DIVE by Frederick Lankard, pg. 100, Sept.
 NAVY DIVER by Michael J. Ganas, pg. 12, Oct.
 DIVING ACCIDENT NETWORK by Arthur Dick, M.D., pg. 33, Oct.
 THE CRISIS OVER GUN CONTROL by Robert E. Petersen, pg. 39, Oct.
 1981 NOGI AWARDS by Jim Walker, pg. 41, Nov.
 PAOI INTERNATIONAL COLLEGE by Marty Snyderman, pg. 56, Nov.
 DOCK DIVING by Glenn Cole, pg. 69, Nov.
 JELLYBEAN LUAU by Jim Flagg, pg. 86, Nov.
 SHIPWRECK LEGAL STATUS by Bert M. Halliday, pg. 96, Nov.
 FIREFLIES VS JAWS by Ellsworth Boyd, pg. 42, Dec.
 CHRISTMAS AT DEPTH by Bob Burgess, pg. 110, Dec.

PERSONALITIES

CHUCK NICKLIN by Hillary Hauser, pg. 28, Feb.
 RON AND VALERIE TAYLOR by Hillary Hauser, pg. 26, Apr.
 BLACKIE COLLINS, pg. 64, May
 STAN WATERMAN by Mimi Harrison, pg. 58, Sept.

PHOTOGRAPHIC EQUIPMENT

IKELITE'S SUBSTROBE M by Geri Murphy, pg. 40, Jan.
 THE TOSHIBA TM-II by Jim and Cathy Church, pg. 44, Jan.
 NIKONOS CLOSE-UP OUTFIT by Geri Murphy, pg. 56, Feb.
 FUJICA'S HD-S CAMERA by Geri Murphy, pg. 50, Mar.
 RICOH MARINE AD by Geri Murphy, pg. 44, Apr.
 SEA FLASH II by Geri Murphy, pg. 50, Apr.
 CANON'S MARINE CAPSULE A by Geri Murphy, pg. 68, May
 SUBSEA MARK 150 by Geri Murphy, pg. 76, May
 TUSSEY T-300 HOUSING by Geri Murphy, pg. 56, June
 SEA & SEA YS 150 STROBE by Geri Murphy, pg. 64, June
 NIKON'S SB-101 SPEEDLIGHT by Geri Murphy, pg. 42, Aug.
 IKELITE'S ICS by Geri Murphy, pg. 42, Sept.
 THE HULCHERAMA PANORAMIC CAMERA by Peter Skinner, pg. 100, Dec.

PHOTOGRAPHY

FISH PHOTOGRAPHY by Jim and Cathy Church, pg. 52, Feb.
 EXTENDED RANGE BLACK AND WHITE by Jim and Cathy Church, pg. 27, Mar.
 RELEASE YOUR CREATIVITY by Jim and Cathy Church, pg. 30, Apr.
 UNDERWATER CLOSE-UP TIPS by Jim and Cathy Church, pg. 32, May
 SPREAD YOUR LIGHT AROUND by Jim and Cathy Church, pg. 48, June
 FUJICHROME 100 by Jim and Cathy Church, pg. 72, July
 EKTACHROME 200 by Jim and Cathy Church, pg. 24, Aug.
 PADI PHOTO SEARCH '81 WINNERS by Jeff Nadler, pg. 52, Aug.
 USA PHOTO CONTEST WINNERS by Paula Novotny, pg. 24, Oct.
 IMAGES, IMAGES by Robert Bethel, pg. 36, Nov.
 OZARK REFLECTIONS by Mary Hartman, pg. 70, Nov.
 PLANNING SLIDE SHOWS by Jim and Cathy Church, pg. 68, Dec.

READER PREMIUM by Bonnie J. Cardone

PADI REPETITIVE DIVE TABLES, pg. 21, Jan.
 NAUI DIVE TABLES, pg. 23, Feb.
 NU-WAY DIVE TABLES, pg. 62, Mar.
 JEPPESEN SANDERSON DIVE TABLES, pg. 28, Apr.
 DACOR'S REUTER DIVE TABLES, pg. 39, May
 PADI HAND SIGNALS, pg. 24, June
 JEPPESEN SANDERSON AIR CONSUMPTION TABLES, pg. 8, July
 SCUBAPRO DIVE TABLES, pg. 54, Aug.
 SSI DIVE TABLES, pg. 19, Sept.
 SCUBA TANK SYMBOLS, pg. 87, Oct.
 DIVER IDENT CARD, pg. 72, Nov.
 SDM'S EQUIPMENT CHECKLIST, pg. 19, Dec.

SCUBA QUIZ by Dennis Graver

EMERGENCY SWIMMING ASCENTS, pg. 51, Jan.
 RESPIRATION, pg. 63, Feb.
 THE MOUTH AND DIVING, pg. 57, Mar.
 CURRENTS, pg. 37, Apr.
 BUOYANCY CONTROL, pg. 19, May
 HAND SIGNALS, pg. 45, June
 DRYSUIT DIVING, pg. 81, July
 J-VALVES, pg. 27, Aug.
 PROPULSION, pg. 53, Sept.
 SEASICKNESS, pg. 37, Oct.
 OCEAN SURVIVAL, pg. 47, Nov.
 BOAT DIVING, pg. 49, Dec.

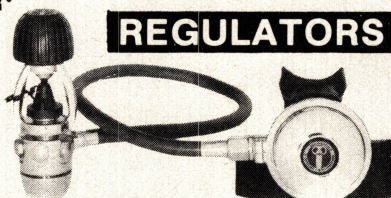
WRECK DIVING

SALVAGING AMERICAN HISTORY by Mark J. Terry, pg. 84, May
 LAKE MICHIGAN WRECKS by Bill Steinborn and Dan Johnson, pg. 16, Oct.
 SAGA OF THE JACOB JONES by Ellsworth Boyd, pg. 34, Oct.
 WRECK FACTS by Ellsworth Boyd, pg. 85, Nov.
 THE BLACKTHORN by Jim Black, pg. 88, Nov.
 CUBAN FEVER by Steven Barsky, pg. 104, Dec.

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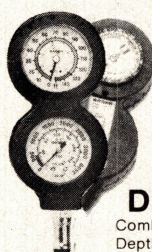
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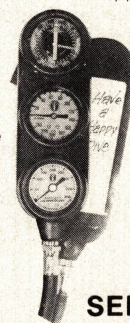
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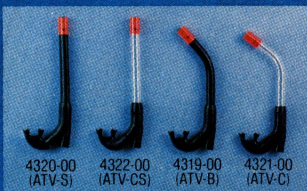
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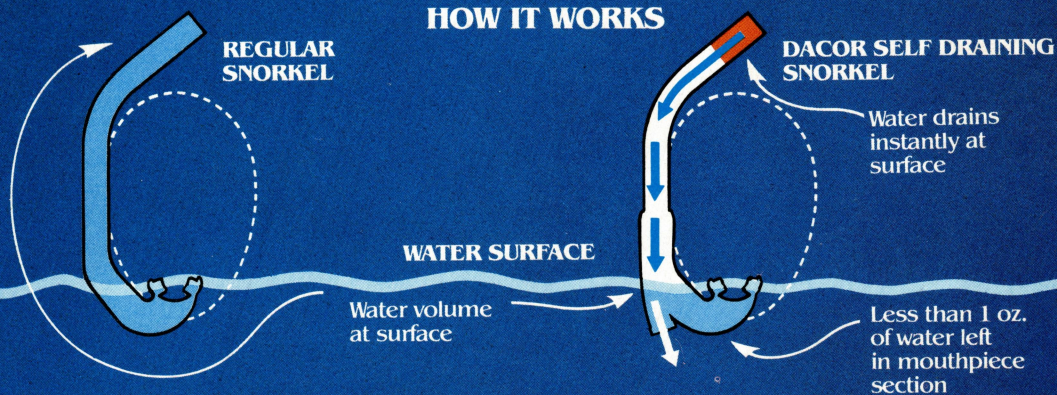
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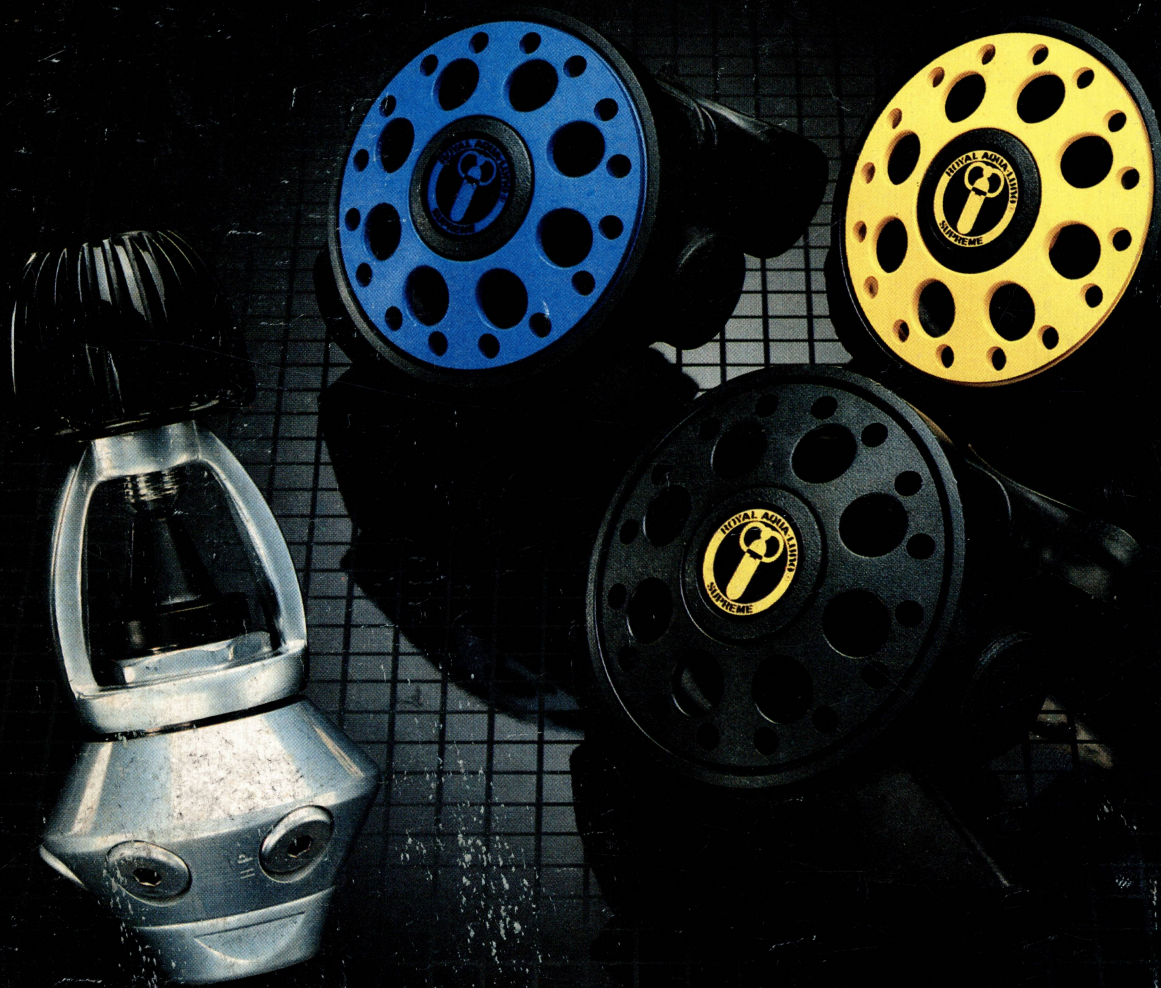
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